

Dr Eleanor's
BOOK OF COMMON
ANTS



Preface

I grew up imagining I might someday go to a faraway tropical forest as an explorer. I imagined that in faraway places big new discoveries were still possible, discoveries of great and hidden empires. I was lucky enough to go to such places and even to make a discovery here and there. But as I have gotten older, I have discovered something even more fantastic. I have discovered that great and poorly explored empires can be found not just in the deepest jungles, but also in backyards. New species, and even whole societies remain to be studied in the dirt beneath our feet.

Among the least explored empires are those of the ants. Ants live nearly everywhere. They do not appear to have made it to outer space, but it seems only a matter of time. Some kinds of ants have been very well studied, but just as for beetles, mites, spiders or other arthropods, most have not. As a result, the tropical explorer Andrea Lucky and I, along with a large number of colleagues, started a project called the [School of Ants](#). With the School of Ants, we aimed to give kids and adults around the U.S. (and now in parts of Italy and Australia) the wherewithal to go into their backyards and collect ants in order to document where ants of different species live in the U.S. The project is new, but already the discoveries have been big. One little boy in Washington State discovered an ant species

living in his backyard that was only thought to live in the southeastern U.S., for example.

But knowing which species live where is just a starting point. Having found the kingdoms of the ants, the real challenge is to spend the time necessary to learn their ways. The good news is that for each of the most common ant empires in backyards, major discoveries are still possible. This is what I wish I knew as a kid. I wish I knew that instead of (or simply before) heading away to tropical forests to make new discoveries, I could have made them in my own backyard. But there is a catch.

The catch is that in order to make discoveries, one needs to know what is already known, where the last path ended and where the new one might begin. There is no book on North American ants that will tell you what we know about the common ants. Most of what is written about the common ants is about how to kill them (which is a shame given, that in contrast to termites, most common ants do no harm and offer a great deal of benefit to our yards and even homes). But all of that has changed.

Dr. Eleanor, an ant biologist from Goldsboro, North Carolina, has told the stories here of the most common ants in North America. These stories are fun, but they are also something more; they are a clear indication of where the path ends in our

understanding of these common species. Some of the ants Dr. Eleanor writes about are relatively well known (see, for example, the fire ant), but most are not and even those that are well known await major discoveries.

I wish I had Dr. Eleanor's book when I was younger. I would have taken it along with a bunch of glass jars, a shovel, a snake stick and my other explorer's gear out into the forest behind my house. With it in hand, I would have tried to add the new chapters to the book. This is what we hope you do, because the truth is that each of Dr. Eleanor's funny stories about the most ordinary of our ants is just the first chapter, a chapter that needs you to help add to it. And so go forth, young reader, and see what you can find.

- Rob Dunn

1 Introduction

What's the big deal about ants?

Before you dive in, let's start with some basic ant biology and a little natural history...



Photo by Alex Wild

What's the big deal about ants?

We might not notice them, but ants surround us, occupying nearly every type of habitable nook and cranny across the globe. Right now, ants snuggle up to your house, lay out their doormats in front of the trees in your yard, and snooze under your park benches. Some even nest inside the acorns littering the ground!

We might not notice them, but they're there, and they shape, literally shape, our world. Look at the colossal trees in your forest, the plants around your lawn. Ants like winnow ants plant the forest understory, ultimately contouring plant distribution that becomes those giants of trees, animal homes, abounding green life. Other ants help turn soil (more than earthworms in some places!), break up decomposing wood and animals, and keep the canopy healthy.

Ants creep across our yards taking care of business for us in much the same way. They eat termites and chase caterpillars out of our gardens. Even though some people think of ants as the tiny creatures that ruin their picnics, of the nearly 1,000 ant species living in North America, fewer than 30 are true pests, and fewer still actually can hurt us.

Most ants spend their time pulling the threads together in the quilt of the natural world. Without these threads, the quilt would fall apart, become disconnected pieces of fabric. In this book, you

will meet our most common ants. Odds are you can see these ladies tiptoeing all around you. See how beautiful they are, with their spines and ridges, their colors and proud legs, each feature lending itself to the individual's task. See their work, how they build the world around us as they move about our lives.

What's in an ant?

Like all insects, adult ants have three body segments: the head, thorax and abdomen.

Heads up

Their windows to the world, ant heads are packed with everything ants need to detect their environments. With tiny eyes for detecting light, color, and shadow; brains for memory and decisions; mouths for tasting; antennae for touch and smelling, ant heads are one-stop shops for sensory overload.

Thorax

Ant thoraxes are mainly for moving. While their nerve cord, esophagus, and main artery course through the thorax, connecting head to bottom, thoraxes are mostly all legs and muscle. Every one of an ant's six legs sticks out of her thorax, and when queens and males have wings, those wings stick out of the top of their thoraxes.

Abdomen and Petiole: One lump or two?

The abdomen is where all the action happens; this ant segment holds all the big-time organs. Almost all of an ant's digestive system is packed into its booty, as well as tons of chemical-emitting glands, stingers and trail markers, the entire reproductive system, and most of its fat storage. Many ant species have a special stomach in their abdomens that does not digest food. Instead, they use this stomach as a backpack to carry food back to the nest where they share it with their sisters by spitting it into their mouths.

The first part of an ant abdomen is called the petiole. The petiole is that really skinny section between the thorax and an ant's big fat bottom, which we often call a gaster. The petiole gives ants that Hollywood wasp waist and helps them to be flexible when they move around. A lot of people interested in identifying ants check that petiole first to see if it has one bump like some ant species have or two bumps like other species have.



Where's the nose?

Unlike us, ants don't have noses. Instead, they smell and breathe with different body parts. To smell, they mostly use their antennae. To breathe, they have little holes all along their body called spiracles, which they can open and close. When they open, air rushes into beautiful silvery tubes that lace their insides and bathe their organs with the air they need to survive.

The Ant Life Cycle

Like butterflies, beetles, and flies, ants grow up in four stages: a tiny egg, a worm-like larva, a pupa, and the adult stage that most of us recognize as ants.

Eggs

For most species, only the queen lays eggs that become workers. Most of the time, eggs are creamy-colored orbs smaller than the period at the end of this sentence. When queens fertilize the eggs, females hatch. When they don't, males hatch.

Sometimes, like when the colony is just getting started, queens lay eggs called "trophic" eggs. Delicious and nutritious, workers and developing larvae eat trophic eggs and use that energy to help the colony grow. Occasionally, workers lay eggs, but queens

Photo Gallery - The ant life cycle



Complete metamorphosis: Ants pass through egg, larva, and pupa stages on their way to adulthood. - © Alex Wild



and other workers sniff about the nest and gobble those eggs as soon as they find them, no bacon needed.

Larvae

The only time an ant grows is when it's in the larval stage. Most larvae look like wrinkly grains of rice or chubby little maggots. Fat pearlescent white tubes with plump folds and wormy mouths, ant

larvae are the chicken nuggets of the insect world. When colonies get assaulted by other ants or insects, these little chub monsters are usually the first to go. Because they have no legs, they can't run away, and they make easy meals for anyone able to break into the nest.

Unable to feed themselves, larvae sit like baby birds with their little mouths open, begging for workers to spit food down their gullets. When workers give larvae special food at just the right time, their body chemistry changes and they grow up to be queens.

As larvae grow, their skin gets tight on their bodies. Like an old pair of blue jeans, they wiggle out of the tight skin, revealing a brand new, bigger skin underneath. Never wasting the chance for a snack, workers scarf down those discarded larvae skins when they find them.

If you look at older larvae under a microscope, you'll see sparse hairs jutting out of their supple flesh. I know a scientist who wanted to find out why they have these luxurious locks, so he gave larvae haircuts and watched what happened. The verdict? Shorn larvae fall over like little drunk sailors. They need their hair to anchor them to surfaces.

Pupae

When larvae grow big enough, they quit eating and get really still. Some ants will spin a silken cocoon around themselves to have a

little privacy, and others will just let it all hang out. While they look like they're not doing much during this pupa stage, their bodies are changing and shifting around inside that last larval skin. They're developing legs and body segments, antennae and new mouthparts. They're turning into the ants we recognize.

When they're ready, they squeeze out of their last skins, emerging as full-grown ants. At first, they tumble about like baby deer, unsure on their legs, soft and pale like the larvae they used to be. But after a while, their skins darken and harden, their step becomes surer, and they begin their work as adults.

Workers

The two most important things to remember about ant workers are the following:

1. Workers are all adult ants. Once an ant looks like a recognizable ant, it will never grow again. When you see a little ant, it's not a baby ant; it's just a species of ant that is really small.
2. All workers are females. So pretty much every ant you see walking around is a girl, and pretty much every job ants do is done by workers. While queens get the colony rolling and keep it strong by laying eggs, workers get the groceries, keep intruders out, take out the trash, feed the babies, repair the house and more. When we talk about ant behavior and the special characteristics of ants in this book, we're talking about the

behaviors workers exhibit in the natural world since they are the colony's only contact with the outside world.

Queens

Despite their regal moniker, ant queens are mostly just egg-laying machines. When queens first emerge, they usually have wings,

Photo Gallery - Queens



A young winter ant queen climbs high to launch her spring mating flight.
- © Alex Wild



but after they find a lucky someone (or someones) and mate, they rub off their wings, let their booties expand with developing eggs, and go to town eating food and popping out eggs. Protected deep within the nest, workers feed queens and keep life peachy for them so they can produce healthy eggs for the colony.

Males

Male ants are easy to discount because they don't seem to do too much around the colony. Unlike their more industrious sisters, male ants refrain from cleaning up around the house, taking care of the babies, going out to get food, or keeping bad guys out. The one thing male ants do in the colony is mate with queens.

To date, scientists have spent very little time studying male ants. But these mysterious and weird-looking creatures, invite a closer look. Compared to their sisters, most male ants have tiny heads and huge eyes. Often, they look like wasps. Nobody knows for sure what the boys do when they leave the nest. What are they eating? Where do they sleep? Why doesn't anybody seem to care?

What's in an ant colony?

Many different types of ants nest in pretty much any type of shelter. While fire ants push up their great earthen mounds for all to see, acrobat ants might have their mail delivered to a tiny piece

Photo Gallery - Those other guys (the males)



A male leaves the nest and climbs high to embark on his mating flight. - © Alex Wild



of bark on a tree limb, and winter ants scurry down inconspicuous holes in the ground to their underworld mansions. While ant nests differ greatly, when you crack one open, you'll most likely find lots of workers (the ants we most often see in the "real world"), a queen (many species have several queens), and a white pile of eggs and babies.

Most ants carry out the trash and their dead, piling it in their own ant graveyards/dumps, called midden piles. Like any good detective, you can learn many things from going through an ant's trash. If you find a midden pile, you can get a good idea of what the ants have been eating and whether or not the ants are sick or at war with other ants. You'll probably discover bits of seeds and insect head capsules stuffed in with dead ants. When tremendous numbers of dead ants litter the piles, it's likely the colony is sick or warring with other ants.

Back inside the nest, the ants busy themselves with their daily anty lives. You can take some cookie crumbs and call them out to you. See how they sniff the earth with their antennae, each one a living being experiencing the world, doing its special job. Watch them communicate, following one another under blades of grass and around pebbles, stopping every now and again to touch one another's faces, clean their legs, investigate their surroundings. Ants saturate our environment, from our homes to the sidewalks, city streets, and forests spread all around us. They are our neighbors, our friendly fellow citizens working away as we work. It's time we introduce ourselves.

Photo Gallery - Ant architecture



Most folks recognize these sandy desert mounds as a typical ant nest. But ants build their homes in an amazing variety of structures and places. - © Alex Wild



2 Carpenter Ant

Camponotus pennsylvanicus

One of the U.S.'s largest and friendliest ants, black carpenter ants lumber through your lumber.



Meet the Black Carpenter Ant

The black carpenter ant, *Camponotus pennsylvanicus*, is one of the United States' largest and friendliest ants. Because of their size and pleasant disposition, they make excellent ambassadors between the ant and human world.

When I was little, I took my breakfast crumbs out to the front yard to feed the black carpenter ants living in the willow oak trees. I built little piles of bacon and toast for them on top of oak leaves and waited for them to lumber out from holes hidden in the bark at the base of the trees.

You can identify black carpenter ants by looking at their size (BIG) and the light dusting of golden hairs on their head, thorax and abdomen. Unlike some ant species, black carpenter ant workers vary in size and shape within the colony. Between 1/4 and a little over 1/2 inches long, a small black carpenter ant can comfortably straddle a plain M&M, and a large one can just about straddle a dime. Colonies have between about 350 to almost 2,000 workers, which, depending on worker size, works out to be almost 200 dollars' worth of dimes banging around inside those trees or, more deliciously, up to 40 bags of M&Ms.

Give me the stats!

Size: 0.25-0.5 inches (it's a big one!)

Where it lives: Black carpenter ants prefer to nest in living, standing trees, but will also nest in logs and wood in human structures.

What it eats: Omnivores, black carpenter ants eat protein foods, including other insects, as well as sugary foods.

Breakfast for Ants

I loved those ants. I was fascinated by the way they walked around like miniature black horses, exploring their way with their elbowed antennae, stopping every now and then to gently tap



their sisters and give each other waxy kisses. If I pressed my ear against the tree near their entrance way, I could hear them crackling about their business inside. If I sat still, they would come up to my hands and gingerly pick crumbs off my fingers. If I picked one up, she would explore my arm and shirt. If I squeezed her, she would give me a pinch with her tiny jaws. It never hurt.

They're called carpenter ants because they are particularly good at woodworking. They like to nest in living, standing trees using their sturdy mandibles to excavate tunnels and rooms in the wood. Many people see black carpenter ants living in their trees

and think the ants are killing the trees. However, black carpenter ants actually have a history of helping trees. They have an appetite for tree pests like red oak borers, and they spend a lot of their time foraging around their home, plucking pests off the bark. The trees housing my carpenter ants 25 years ago are still standing today.



Follow her home to the nest!

Because of these woodworking skills, some people think carpenter ants are pests. While black carpenter ants can make their tunnels in the wood of people's homes, they often point homeowners to bigger problems: damp and rotting wood from a leak or drip or other pests living in that wood. When wood

Photo Gallery - Views of the black carpenter ant



A worker out foraging in the canopy. - © Alex Wild



becomes soaked through, carpenter ants can easily use their jaws to snap away and build their tunnels. If homeowners keep their wood dry, carpenter ants will usually stick to the trees. That is, unless the homeowners have pests like termites or wood beetles snacking away inside their walls.

Sometimes black carpenter ants will happen upon such a treasure trove of food and set up camp right next to their grocery store. Can you blame them? Haven't you ever dreamed of living next to your favorite doughnut shop or fried chicken restaurant? Instead of attacking carpenter ants for living in the walls, use

Camponotus pennsylvanicus

Black Carpenter Ant

Black carpenter ants tending aphids on poplar. - © Dick Walton

them as helpful guides to identify the real problem. I used to think my carpenter ants might like some of my bologna sandwiches from lunch, but I couldn't get as many takers at lunchtime as I got early in the morning. That's because carpenter ants are mostly night owls, foraging from dusk until dawn. Black carpenter ants have pretty good vision for ants, using that vision to help them take shortcuts from their house to food in the early morning and when the moon is out.



Ant Speak: Decoded

When they aren't following their sisters' chemical trails, they remember landmarks like pebbles and sticks to help them find their way home. These landmarks save time for black carpenter ants, who can forage up to 100 yards from their nest. That's the human equivalent of walking over 11 miles for food. On new moon nights when it is totally dark, black carpenter ants take no shortcuts and feel their way through the night, keeping their bodies close to structures.

When carpenter ants find food, they run back to the nest, laying a chemical trail behind them. Once inside the nest, they do an "I-found-something-awesome" dance to get their sisters awake and excited enough to follow them. The hungrier the ants, the more vigorous the dance. The excited sisters then rush out of the nest in search of the chemical trail that leads them to the food.

Carpenter ants, like many other ant species, have little built-in knapsacks called crops inside their bodies. They stuff these crops with food to take back home. When they meet their sisters on the trail, they stop and have a little conversation that goes something like this:

Ant heading out to food: *"Hey, what's up?"*

Ant returning from food: *"Are we from the same nest?"* (They do this by tapping each other on the head with their antennae to see if they smell alike.)

Headed out ant: *“Yeah, but I’m not sure what I’m even doing here. I’m just following this trail.”* (She moves her tapping antennae closer to her sister’s mouth.)

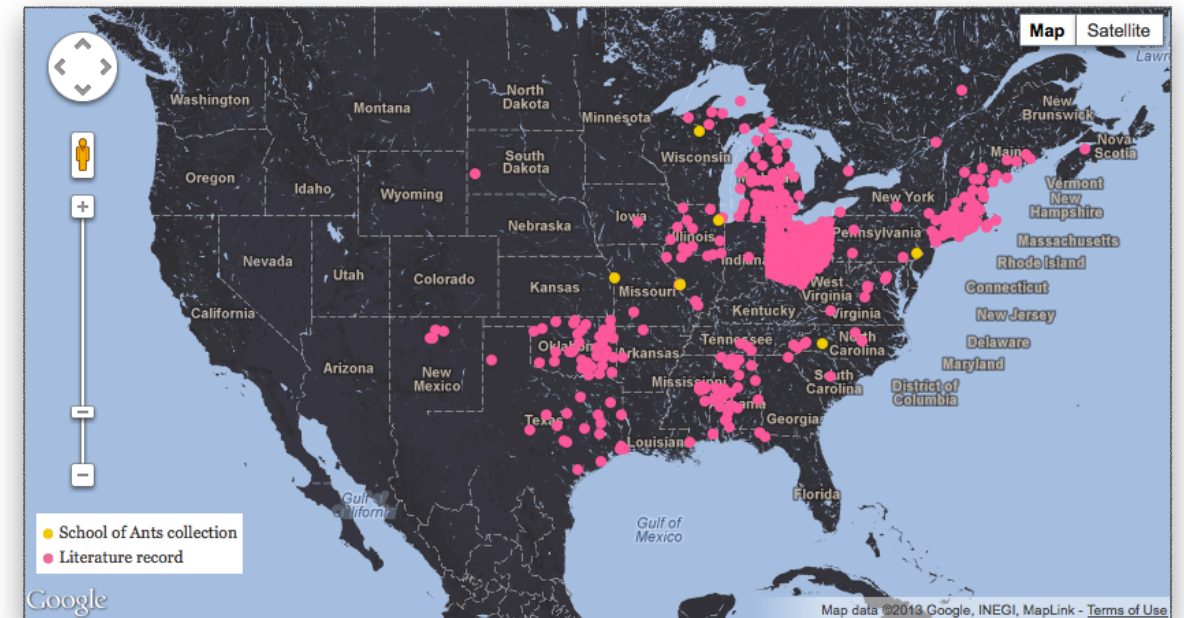
Returning ant: *“Oh, wow! I should have told you earlier. Some kid spilled his Dr. Pepper down the street and it is DELICIOUS. Everybody’s over there now drinking it up. Want to try?”*

Headed out ant: *“That sounds awesome. Of course.”*

Returning ant spits a little droplet from her crop into headed out ant’s mouth. Headed out ant drinks it and agrees it is awesome. Awesome enough, in fact, to continue running down the trail.

When I was a child, I saw black carpenter ants having these sorts of conversations all the time and thought they were kissing. When I grew up, I learned that I already knew much about black carpenter ants from watching them as a child. Their colony size, where they nest, and how they eat are all scientifically dissected and explored as thoroughly as the ants themselves explore the dark tunnels of their homes. Scientific papers explain how they talk to each other, when they’re awake, and why they don’t want bologna on hot summer afternoons. Every delicate golden hair on the black carpenter ant’s rump has been counted and catalogued. These discoveries took many decades to document. All of them can be made any morning by each one of us, holding our breakfast crumbs, waiting patiently in our front yards.

School of Ants Map - Eastern Black Carpenter Ant



North American distribution of the eastern black carpenter ant. Visit schoolofants.org for an interactive version.

3 Pavement Ant

Tetramorium sp.E

Pavement ants have tough skins to help them withstand fierce battles.



Photo by Alex Wild

Meet the Pavement Ant

Wars happen across America every spring. Just as the trees begin to give us their first peek of color and the sun warms us enough to stretch our legs and venture outdoors for a look around, the animals begin stretching their legs too.

Each spring ants peek their antennae out of earthen holes, getting a feel for their new year on the beat. Pavement ant (*Tetramorium* *sp.E*, although it is common, scientists have yet to give this species a real name) workers push out of their nests with a mission: to establish their neighborhoods before ants from other nests nudge in and squeeze them out. These ladies are territorial, and they don't like any other ants walking on their turf. When they first emerge in spring all last year's boundary lines have been wiped away with winter and all bets are off. They draw their property lines with warfare so gruesome it would make Atilla the Hun blush.



Give me the stats!

Size: 0.19 inches

Where it lives: Pavement ants most often nest under bricks or pavement, but they are also found in grassy areas near sidewalks and even in extreme environments, like salt marshes.

What it eats: Ultimate opportunists, pavement ants eat anything from dead insects to honeydew, a sugary food leaf hoppers produce. They also dine on pollen, food in your kitchen and garbage.

Pavement ants are built for battle. At 3/16 of an inch, workers are about half as long as one of your shirt buttons is wide. They are dark reddish-black and have antennae that bulge out at the tips so they look like they're waving little clubs off their foreheads. They have tough, armor-like skins called exoskeletons that can withstand the knocks of war. If a pavement ant was the size of a dog and you could get a good close-up look, you would see a beautiful landscape. Their faces and bodies are covered with hilly peaks, rivers of grooves and hairs, and they have two little mountains of spines poking out from their backs toward their rear ends.

Photo Gallery - Pavement ants doing battle



Two colonies of pavement ants battle for territory. - © Alex Wild



Where neighborhoods overlap, huge numbers of workers from each side collide. They furiously drum one another on the head with their antennae; they rip one another apart with their mandibles. They'll separate an individual from the pack and close in around her, gnashing at her body with their jaws, grabbing her with their claws, turning her into ant dust. These ants mean business when it comes to setting boundaries. After the melee, the carnage is astounding. Thousands of ants litter sidewalks

across the country, a jumbled dark reddish/black line of body parts and pieces that blow around in the wind.

When they aren't out cruisin' for a bruise, pavement ants move along slowly compared to other ant species as though they don't have anything to do in this big old world but go for a walk in nature. They won't sting you, and they aren't easily spooked. Whereas some ants shoo away quickly, pavement ants usually continue to bumble along unbothered.



Take a closer look at the battle raging down below.

Pavement ants are not native to the United States, but they hold a place as one of the most common species around. They sailed over here in ships from Europe more than 100 years ago and flourish in the stone-slab environments of cities that humans created. They most often build their nests under bricks and in sidewalk crevices and will eat everything from sugary foods to dead insects to flower pollen to human garbage.

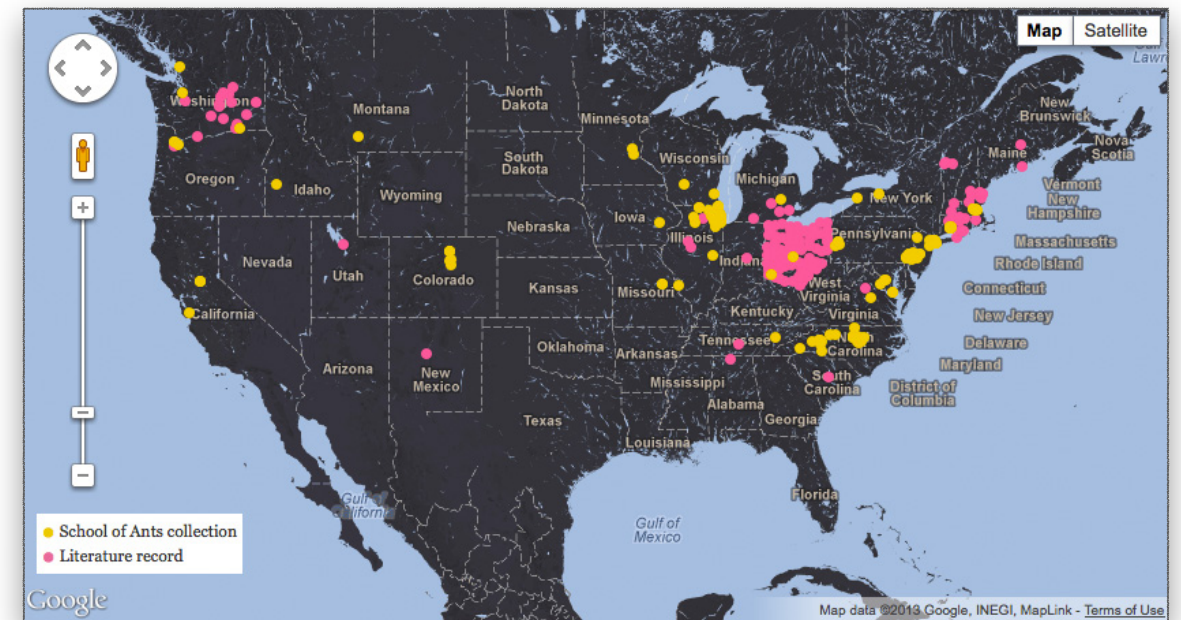
Sometimes, pavement ants act like miniature farmers. They collect seeds from plants and accidentally plant them by burying them in their nests. They also tend insects called planthoppers like a rancher tends cattle, "milking" them for a sugary food the planthoppers produce called honeydew. If a planthopper predator

comes lurking around, pavement ants pick the planthoppers up in their mouths and carry them down to their nests, where they'll wait out the trouble. They also keep interlopers off their property and will wipe out any upstart fire ant nests that try to pop up on the homestead. But this is all during peace time.

Back to spring. The birds are practicing their songs, and you and I are hopping off the school bus, picking up lucky pennies, walking our dogs, going to get coffee on our sidewalks that zig and zag from New York City down to Florida, across Tennessee, the Dakotas and Wyoming all the way to California. Each day, as we walk around in our world, the human world of sidewalks that point us to and from where we want to go, we are also walking over the world of the pavement ant, with devastating wars, property disputes, and peace times filled with farming and baby making. Their world so similar to ours, so close to us that we step over it every day without noticing how unusual it is.



School of Ants Map - Pavement Ant



North American distribution of the pavement ant. Visit schoolofants.org for an interactive version.

4 Odorous House Ant

Tapinoma sessile

One of our most common household pests, odorous house ants have mastered breaking and entering to snack on your sweets.



Photo by Alex Wild

Meet the Odorous House Ant

People across the U.S. phone me all the time to tell me they have ants in their houses. It's one of my favorite parts of knowing a little bit about insects. From my grandmother Ina down in Opelika, Alabama, to my good friend Ariana out in Los Angeles, to my friend Sarah's grandmother's friend up in Baltimore, the call is always the same: "Help me! I'm under attack! I've got ants in my kitchen!"

I love these calls because they make me feel like a living wizard. Here's why: Most people in the U.S. have only one of three or four types of ants wandering around their kitchen. By asking a few process-of-elimination-type questions, I can usually narrow the identity of their trespassers down to species. It's simple, but it seems like magic to the people on the other end of the line. To let you in on the secrets of my sorcery, here's an example of a call with Sarah's grandmother's friend (SGF):



Give me the stats!

Size: Workers: 0.09-0.13 inches

Where it lives: Odorous house ants nest indoors (under sinks and doormats and in insulation and dishwashers) and outdoors (under rocks and in garbage cans, potted plants and exposed soil).

What it eats: Honeydew, a sugary liquid made by the small insects called aphids and scales, and other sugary food left out by humans. Odorous house ants also eat dead insects and spiders.

SGF: *"Help me! I'm under attack! I've got ants in my kitchen!"*

Me: *"Are they big or little?"*

SGF: *"They're tiny!"*

Now I know she doesn't have big carpenter ants or the less probable field ants. She also doesn't have Asian needle ants.

Me: *"What color are they?"*

SGF: *"I gotta look at them? Hold on. I gotta get my reading glasses. Hold ... on ... Okay! They're black!"*



So, Sarah's grandmother's friend doesn't have pharaoh ants or fire ants. Plus, she probably doesn't have the brown Argentine ants.

Now I know what she has in her kitchen. Time for my big finish.

Me: *"Here's what I want you to do. I want you to squish one. I want you to roll it between your fingers and put it up to your nose and sniff it."*

SGF: *"I'm sorry, what?"*

Me: *"Just do it. Tell me what it smells like."*

Sarah's grandmother's friend squishes. She makes the I'm-squishing-an-ant sound people make that comes out as a mix between "ooh!" (fun!) and "eew" (gross.). The result of this squish-and-sniff will tell me whether she has little black ants (about half the size of a sesame seed) or odorous house ants (a little bigger than a sesame seed).

SGF: *"It smells ... it smells good! It smells!"*

Like most people with ants, Sarah's grandmother's friend has odorous house ants partying in her kitchen. Their telltale smell gives them away. She's a lucky lady. Neither dirty nor dangerous, this top home pest --also known as sugar ants-- can provide

hours of entertainment for anyone willing to share space with them. Follow them home to see how they bunk! Put out food and see how long it takes them to find it! Lay an E.T. trail of snacks to shift their ant highways! Possibilities for fun abound.

Country Ant, City Ant

Even though odorous house ants pester people around the country, unlike some ant pests like red imported fire ants and Argentine ants, odorous house ants are home-grown U.S. natives. Named for a defensive odor they emit from their rumps that some describe as "spoiled coconut suntan lotion," they nest in natural environments like the woods or pretty much any manmade locale like potted plants, under doormats or in cars. As with Aesop's country mouse and city mouse, "country" odorous house ants (those living in natural, wooded areas) and "city" ants (those living in manmade environments) lead different lifestyles.

In the country, odorous house ants play an important role keeping the earth a clean green machine. They work in concert with other forest bugs to keep canopies healthy and ensure a proper ecological balance with plenty of species hanging around. They also help accelerate decomposition and promote nutrient flow by

eating dead insects and animals and nesting in and under rotting wood, acorns, and in abandoned insect homes.

Yes, out in the country, they live the quiet life and have small colonies of a few hundred to a couple thousand workers. But once they move into cities, odorous house ants go a little wild. Their populations explode, sometimes spanning entire city blocks, and they blanket lawns and kitchen counters with greedy scouts sniffing around for a sugar fix.

When we build cities, we also build the perfect environment for odorous house ants to go berserk. First, it's easy for them to find a job to help support their city lifestyle. Plenty of ant employers looking for work (a.k.a. scale insects and aphids) await in the trees we plant to line our neighborhoods' streets. These creatures depend on odorous house ants to protect them from ladybugs, tiny wasps, and lacewings, all aphid and scale predators. When odorous house ants show up, those predators split, enabling aphid and scale populations to soar. To pay for their security detail, aphids and scale insects give odorous house ants a sweet syrup.



In the woods, odorous house ants compete with different species for places to set up camp. With acorn ants stuffing their homes into acorns, citrus ants pouring out from under tree bark, and acrobat ants peeking down from tree branches, odorous house ants make do wherever they can. But in the city, they can nest anywhere. Vacancies abound. From our garbage cans packed with odorous house ant-ready foods to the luxurious mulch we pile up around our homes, to our kitchen floors, odorous house ants feast, make babies, and have shindigs around us all the time. City odorous house ants can have many nests per colony with tiny superhighways of workers moving between them, distributing supplies from nest to nest. Some odorous house ant colonies can span a city block.

In the country, as conditions around their nests change, such as when a new, more dominant species comes to town or a big storm floods the area, odorous house ants move out. They generally move their nests around every two weeks or so. This ability to pack up and move willy-nilly in the woods helps them big-time in the ever-shifting, human-made environments. Garbage day? Dumpster-living ants can saunter over to the grassy area. Dumping out those potted plants? Odorous house ants living inside happily toddle over to the compost pile. Having many queens in the nest helps them split up without too many tearful goodbyes.

Photo Gallery - Reproductive superstars



Odorous house ants can have multiple egg-laying queens in the same colony. - © Alex Wild



Roll Up the Welcome Mat

While I see odorous house ants in my kitchen as a happy surprise, I'm aware that not everybody (OK, probably most people) shares my sentiment. It can be disconcerting to watch eager sugarbears trundling across your Wheaties. After I conduct

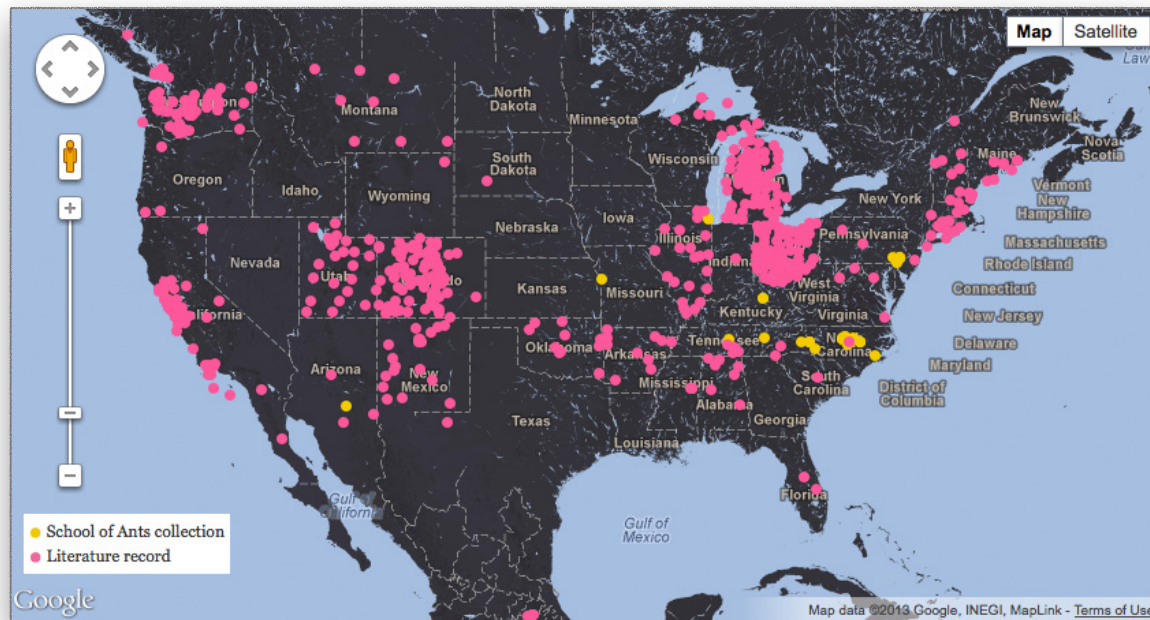
my wizardly diagnosis, the response never seems to be: "What FUN!" It's almost always: "How can I get rid of them?"

Store shelves are packed with poisons designed to extinguish these ladies. However, knowing what we know now about odorous house ants, most of us can outsmart them. Be a gumshoe like Columbo. Stake them out. Follow them home to see how they sneak into your house. Then, eliminate the source. We know that odorous house ants like to hang out in tree canopies and bushes, slurping up honeydew. Walk around the house and see if you have any bushes touching your walls and windows. These branches bridge the ants from their outdoor lifestyles to apartment living. Cut back those branches. Snoop out other ways they enter the house. For example, they sometimes sneak in through cracks and crevices. Seal those with caulk.

We know they love to nest in mulch. People often dump piles of mulch around their homes. Switch that out for rocks, which odorous house ants don't like as much. Or try aromatic cedar mulch, which smells gross to odorous house ants, at least for a little while.

Look where they're crawling around inside, too. We know odorous house ants like sugar and all the delicious little treasures abundant in human garbage, so don't leave food out and tightly seal garbage cans. But even if you try to get rid of these sweethearts, pay attention as you do. Because the truth is, most

School of Ants Map - Odorous House Ant



North American distribution of the odorous house ant. Visit schoolofants.org for an interactive version.

of what might be known about these ants hasn't been uncovered. Most of the treasures of their tiny empire lay undiscovered and so while I can tell you as much as I've told you about sugar ants, I can't tell you much more. When someone calls me up about ants and I do my trick and discover they have sugar ants most of what they then have to report is not just grievance, it is science. And so when Ina says, "They keep stopping and talking to each other with their antennae," or Ariana reports that, "I left my Coke open and they found it in less than 30 minutes!" these are things I write down, things you might write down too. Science is everywhere, even when what all my Ina ever wanted was just a counter clean of ants.

5 Winter Ant

Prenolepis imparis

Winter ants chill out in summer, preferring to hot foot around in colder months.



Photo by Alex Wild

Meet the Winter Ant

Remember in Alice in Wonderland when Alice followed the white rabbit down its bunny hole? The hole was ordinary enough at first, but once Alice climbed in, she fell down and down until she came to a completely different world. Holes like that rabbit's pepper the ground across the United States. If we were as small as ants, we could tumble repeatedly down into other worlds. Winter ants (*Prenolepis imparis*) are the white rabbits of ants. Plunging down their holes gives us a peek into their truly extraordinary lives.

Unless you follow a winter ant home, its nest's entrance can be hard to find. About the size of a buttonhole, winter ant nests aren't a lot to look at on the outside. Inside, deep mazes of tunnels connect chambers all the way to the bottom. They can extend almost 12 feet deep in the soil. That would be the human equivalent of a class of second graders digging a hole more than 1.14 miles down, deep enough that 150 school buses could be stacked end-on-end before reaching the surface.



Give me the stats!

Size: Workers 0.1-0.14 in; queen 0.32 in; males 0.11-0.15 in

Where it lives: Winter ants nest deep in the soil near tree bases or in open ground, like lawns.

What it eats: While winter ants won't pass up on the opportunity for a sugary snack, these ladies prefer protein-packed food, noshing on other insects unlucky enough to endure winter's chill.

All that depth serves a purpose. While most ants are active in the spring and summer, winter ants prefer the fall and winter. Soil temperatures do not vary as wildly as the temperature above ground, so when winter's chill plummets the air to 33°F, the winter ant's nest is kept insulated by the earth at a balmy 64-68°F. This heat is important because between 40-50°F, most insects have a serious case of freeze brain, going into what bug people call a "chill coma," where their muscles stop working so they can't move. Underground, winter ants beat the ice. Above ground, they dig short "warming tunnels" scattered around their nest. When they start to get cold walking around outside, they run down into the tunnels and warm up.

Staying Out of Trouble

My mother always told me the best way to stay out of trouble is to avoid it. Winter ants are masters at avoiding trouble because they move about when trouble is fast asleep. From March to November, when most ant species scramble around gathering food and fighting one another for space, winter ants seal themselves tightly in their nests. When November rolls around and other ant species tuck themselves in for their winter nap, winter ants unseal their nests and begin exploring the world. Because they are active when other ants sleep, they often miss the dangerous tides of invasive ants that can wipe out many other ant species, and therefore persist in areas inhabited by other inhospitable ants. If they do happen to meet an adversary, they spray a toxic chemical from their rumps that scares off or even kills the would-be contender.

How to Spot Them

At the beginning of winter, winter ants are hard to identify. Shiny reddish-brown with lighter yellow legs, they look like your everyday, run-of-the-mill ant. Early season, workers are about 0.1 inches long, just lengthy enough to span the letter “t” on this page. But as the season progresses and winter ants stock up on food, they become easier to identify.

Photo Gallery - Stocking up on sweets



The beautiful winter ant, also known as the “false honeypot ant.” - © Alex Wild



To say a winter ant has a lot of “junk in her trunk” mid and late season is an understatement. When workers eat their favorite protein foods like insects and a sugary substance produced by other insects called honeydew, they stockpile the calories in special fat cells in their bums. These fat cells can grow to be tremendous; ant baby got back as it were. Because they waddle

around with swollen rumps at the end of the season, some people call winter ants “false honeypot ants.”

To understand why they pack on the pounds, let’s poke our heads down into their rabbit hole. Winter ant colonies survive underground all summer on their rotund sisters’ fat. Their ample behinds are the world’s best refrigerators. Because fat cells are part of living tissue, as long as the worker is alive, the fat won’t rot like dead insects stored in the nest would. And because the fat is already concentrated and high in calories, workers don’t have to process it like they would other foods. Winter ants store enough fat in their portly posteriors to feed each other and all the babies that emerge as adults the following fall. When workers unseal their nests in the fall, they emerge as skinny minnies again.

Home Deep Home

Let’s travel a little deeper down the rabbit hole. While its worker inhabitants live a couple of years at most, winter ant nests can exist more than 10 years. The older the nest, the deeper it is. If we were winter ants crawling down into our home, we would enter through a short hallway leading to the first room. Other than the pinhole of light shining through the entrance, the whole house would be completely dark. To get from room to room, we’d have to smell our way with our antenna. Our rooms would have domed ceilings, tall enough for a couple of us to stand on top of each

Photo Gallery - Spring is in the air



© alexanderwild.co

The winter ant queen, in all her glory! - © Alex Wild



other. Because we’d have clingy feet, we could even walk on the ceiling!

We might have a few hundred sisters—sometimes up to 10,000 living with us—so every now and again, we’d bump into one of our sisters and give her a friendly tap with our antennae. If she

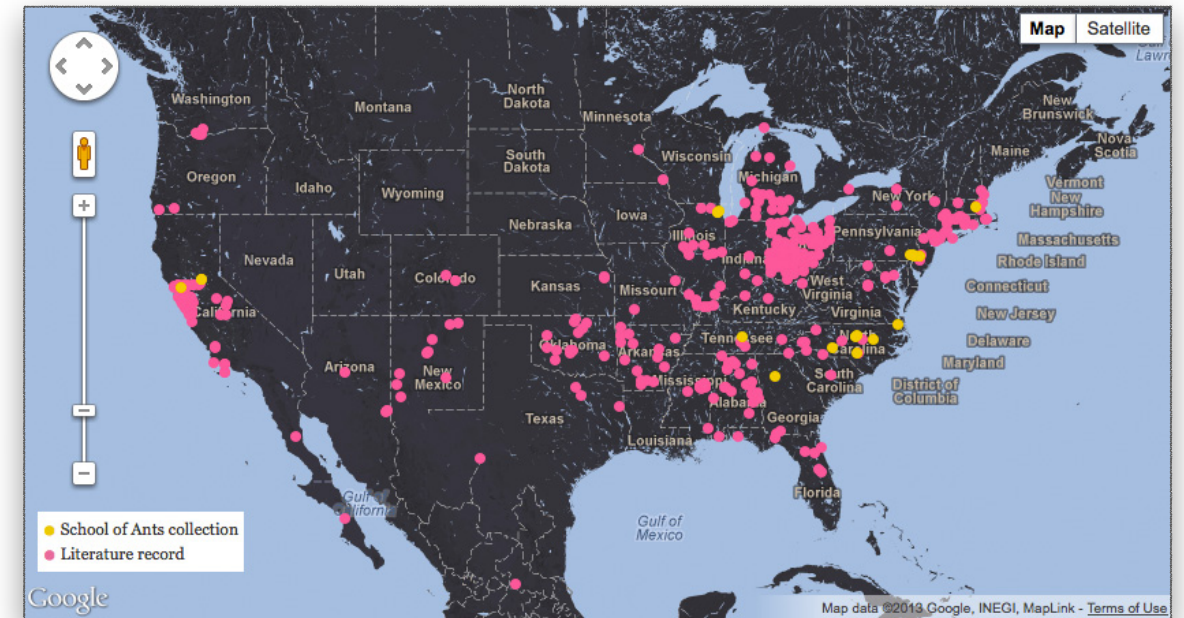
seemed hungry, we might spit a bit of food for her to eat. If she seemed dirty, we'd help clean her with our mouths and antennae.

It might take us a long time to get all the way to the bottom. Remember, our nests are at least the human equivalent of a mile. Our older sisters live in the upstairs rooms, and our younger sisters live with our mothers deep down. Our queen mothers wander around the bottom of our nest in the dark laying their eggs. Our younger sisters help feed the babies and keep them clean while our older sisters gather food for us.

Life Underground

If we were winter ants, we would not be able to hear well, and anyway it's quiet so far underground. We can't hear children running over us or leaves falling on our entrance. We don't know somebody's dad's car just parked next to our own driveway. Beneath the roots, we don't get wet when the sprinkler showers over our home and across the lawn in the summertime. We don't hear the thud of the family dog flopping right on top of us to gnaw on a tennis ball. But it's all there, all above us, all over the United States. If we were winter ants, we'd miss out on a lot about the fascinating lives of people. We're lucky we're not winter ants. We're people, active all year long, and able to understand and delight in the winter ant's secret wonderland, deep below our feet.

School of Ants Map - Winter Ant



North American distribution of the winter ant. Visit schoolofants.org for an interactive version.

6 Asian Needle Ant

Brachyponera chinensis

Asian needle ants are stealthy little ninjas sneaking into our ecosystems.



Photo by Alex Wild

Meet the Asian Needle Ant

The Asian needle ant (a.k.a. *Brachyponera chinensis* or *Pachycondyla chinensis*) reminds me of a ninja superspy. Sleek, sneaky, and all dressed in black, ninjas, at least in bad movies, are masters of disguise and inevitably up to no good. The same holds true for the furtive Asian needle ant; this stealth operative is sneaking across forests and backyards throughout the eastern United States.

Asian needle ants originally snuck into the United States from Japan. Nobody knows how they got here, but they have been moving log to log since at least the 1930s. Slender, shiny, and black with lighter orange legs, Asian needle ants look like they are dressed for subterfuge. At about 0.2 inches long, one worker is almost as long as a kernel of un-popped popcorn.

Asian needle ants aren't fussy when it comes to where they make their home. In the woods, Asian needle ants nest in logs or under rocks and leaves. Sometimes their nests look like caverns connected by tubes and stuffed with eggs and ants. Other times



Give me the stats!

Size: Workers: 0.2 inches, queen 0.25 inches

Where it lives: In forests, Asian needle ants nest in rotting logs, under leaves and mulch, and under rocks. In human environments, Asian needle ants can nest anywhere from potted plants to under door mats, in landscaping materials, and under dog bowls.

What it eats: While it loves termites, Asian needle ants will eat pretty much anything it can find, from dead insects to other ants to human garbage.

they look like nothing more than a group of ants hanging out. Around human structures, they nest anywhere from potted plants to piles of mulch, and even underneath door mats. Colonies can have anywhere from a few dozen workers to a few thousand, and those workers can live in one big nest or many small ones.

The Asian needle ant's distinctive walk is a dead giveaway of its identity. While some ant species lift their legs high and prance around or stomp their way to and from their nests, Asian needle ants, hunker down close to the ground and creep with deliberate, stealthy steps. Like ninjas, they move alone; they never follow the trails of their sisters, they don't know how.

It's easy to confuse Asian needle ants with carpenter ants, as both are medium-to-large and black, but one distinguishing characteristic separates Asian needle ants from wood ants (and ninjas, for that matter): They are clumsy and terrible climbers. If you trap an Asian needle ant in a glass jar she won't be able to climb to the top like other ant species and will instead wander helplessly around the bottom of the jar or run in place like a startled cartoon character. Be careful if you try that trick because Asian needle ants can sting the tar out of you.

A Stinging Sensation

As an entomologist who spends a lot of time studying Asian needle ants, I'd heard of the horrors of their sting prior to experiencing it for myself. The day the first sting happened, I was digging around with bare hands into a log I hoped was infested with them. It was. As I reached into the log to pull off a chunk of wood, I accidentally closed my hand on an Asian needle ant nest. A startled worker stung my palm. Because I had read that two-to-four times as many people are allergic to Asian needle ant venom than are allergic to honey bee stings, my alarm seemed justified. Based on those reports, I was afraid my hand might fall off, but nothing like that happened.

At first, I felt a slight burning sensation right where she stung me. About an hour later, the burn spread out to an area about the size of a quarter around the sting, and it began to feel a little like being

stabbed with pins. This flash of sharp pain followed by a dull nerve ache continued for the next two weeks every time I touched the area around the sting. For those of us not allergic to Asian needle ants, that's the worst part of Asian needle ant stings. I've been stung innumerable times since then, and it's almost always the same.

While Asian needle ants have pricked me many times over the last few years, I don't blame any of them for doing it. Unlike the war-mongering fire ants, which eagerly attack en force, stinging anything they can get their angry little tee-hineys on, Asian needle ants prefer a more peaceable lifestyle and sting only in self-defense as a last resort. Every one of my stings occurred when I put pressure--whether on purpose or by accident--on the worker so she poked me with her stinger to get away.



What's for Dinner?

Most of the time, Asian needle ants use their stinger to subdue their favorite food: termites. Watching an Asian needle ant around termites is like watching me at an all-you-can-eat buffet. She gets very excited, running around grabbing every one she can.

Practically defenseless, termites have thin, soft exoskeletons and are juicy treats for any meat-loving insect. When an Asian needle ant stings a termite, she grabs it in a bear hug and jabs her stinger deep inside. Her venom paralyzes the termite but does not kill it. By keeping the termite alive, she can stockpile it in her nest without worrying about it rotting before she and her nestmates get a chance to eat it.

Asian needle ants love termites, but they aren't picky eaters. If you see one out and about, she is probably scavenging the ground for other ants, dead and dying insects or even human garbage. Unlike other ant species, Asian needle ants do not follow foraging trails. If one finds food too big to bring back to the nest, she will run home and tap one of her sisters imploringly on the head. Her sister responds by folding up in the fetal position. The forager then picks her sister up, tucks her under her body, and creeps as fast as she can back to the food. They'll work together to bring the food back or go get more sisters to carry over to help.

Like ninjas, Asian needle ants are masters of disguise and sometimes sneak into other ants' nests undetected, killing

Photo Gallery - The amazing termite predator



The Asian needle ant captures a termite and delivers a wallop of a sting.
- © Alex Wild



workers. They steal back to their own nests with ant bodies in their mandibles. Then the feast begins.

Their Covert Operation

The Asian needle ant ninja army has a stealthy mission worthy of our attention: to steadily disassemble forests across the United

States. When Asian needle ants move into a forest, other ant species like winnow ants, acrobat ants, little black ants and thief ants all pack their bags and move out, pulling the forest apart at the seams. Asian needle ants make life miserable for other species. They eat them or their food and take up space native species use for nesting.

“Why should we care if a few ant species go missing?” you might ask. “All ants do is ruin my picnic! We could do with fewer of them anyway!” Let’s take a closer look.

Picture a car factory where everybody has his or her special job. One person puts on the windshield wipers, another the wheels, while another is responsible for the engine and another adds the

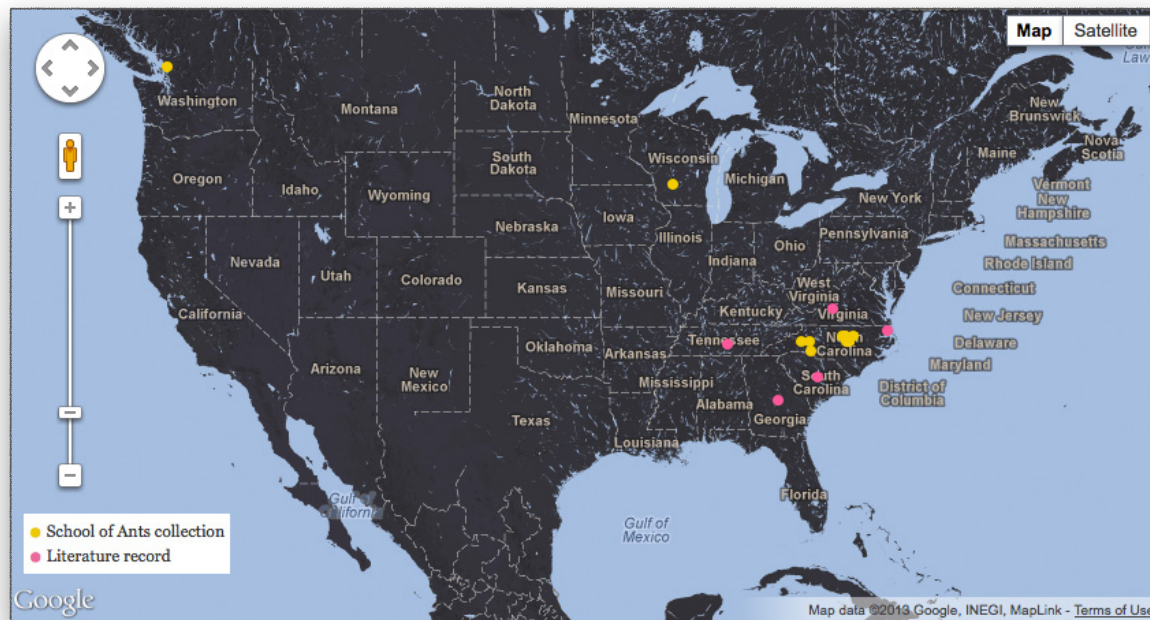
finishing touches like door handles. They all work together to build a beautiful, well-oiled machine. Suppose one day the company hires a new employee to add a new gadget in the car. This employee gets paid a lot of money, so much money the company has to lay off the windshield wiper person, the wheel person, and the engine person. They even kick out the door handle guy.

Here’s the problem: while this new employee is really good at gadgets, he doesn’t know anything about engines or door handles. You can forget the windshield wipers and wheels. What kind of car will this car factory produce without their employees? One that won’t even roll!

Our forest is a lot like the car factory. While some of us might think of ants as pesky, most ant species help keep the world rolling along. In fact, of the more than 30,000 ant species in the world, less than 0.3% are pests. The rest have valuable jobs, and we need them to show up for work each day. Take some of the species Asian needle ants displace, for example. Acrobat ants and thief ants help keep the forest canopy healthy by regulating tree pest populations. Winnow ants move seeds across the forest floor, controlling the distribution of forest plants and promoting healthy forest herb diversity and growth. Little black ants turn the soil, aerating it to keep the trees and shrubs happy. Taking away all these species and replacing them with just Asian needle ants can spell trouble for forest health.



School of Ants Map - Asian Needle Ant



North American distribution of the Asian needle ant. Visit schoolofants.org for an interactive version.

Asian needle ants, those little ninjas infiltrating our turf with their clandestine movements and veiled operations, are a force to be reckoned with here in the United States. Our ants and forests aren't prepared to battle this stealthy foe. They need us to help them fight back. You and I can use our knowledge to spot them and work to kick them out. We can let people like the folks at School of Ants know when we find them, so they can track their movements across the U.S. and research ways to keep them at bay. Asian needle ants might be ninjas, but you and I are a citizen army. Together, we can beat them.

7 Winnow Ant

Aphaenogaster rudis

Elegant ballerinas of the ant world, winnow ants plant forest seeds.



Photo by Alex Wild

Meet the Winnow Ant

Aphaenogaster rudis sounds more like an unsavory medical condition than one of the coolest ant species in North America. It doesn't roll off the tongue like "sugar ant," "carpenter ant," "pavement ant" or "fire ant." So, for the purposes of familiarizing you with one of the best residents on your block, we'll give *Aphaenogaster rudis* a nickname: the winnow ant.

Winnow ants are among the most elegant-looking ants around the forest and in your back yard. With their long legs and slender reddish-brown bodies, they pick their paths delicately across the ground like rusty ballerinas. Each medium-to-large worker measuring at about 0.15 inches long can just cover the date on a quarter. Although they prefer to nest in decomposing stumps and logs, winnow ants can make the best out of any situation, building their homes in open soil, beneath rocks, and even in human garbage. With one queen and up to 2000 workers, a winnow colony could easily pack a stadium for an ant rock concert.



Give me the stats!

Size: 0.15 inches

Where it lives: Winnow ants prefer to nest in rotting wood, but will nest anywhere from soil in open areas to human garbage.

What it eats: The tasty outer coating of seeds and other insects like termites. Winnow ants also like sugary foods.

Beyond their refined appearance and wide-ranging nesting habits, winnow ants have two qualities that set them apart from the rest of the ants: the helping hand they give forest plants and their ability to use tools.

First, let me tell you about their agricultural talents, and the reason we call them winnow ants. Winnow ants have a special relationship with forest plants. We all know that many plants make seeds. Some plants produce seeds with a special coating called an elaiosome that's a lot like the hard candy coating on the outside of an M&M. Like the tasty candy shell, the elaiosome coat has a special blend of flavors that is irresistible to winnow ants.

As they pick across the forest floor in search of food, winnow ants often stumble across these seeds. When winnow ants get a whiff of that elaiosome, they can't help themselves: They have to pick up the seed and carry it back to their nests. Once in the nest, winnow ants feed the outer coating of the seed to their young.

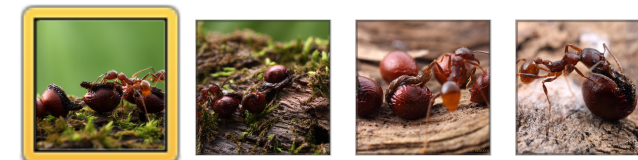
Unlike most of us, who prefer the chocolatey center of M&Ms, winnow ants eat only the elaiosome and leave the seed inside alone. When wheat farmers shuck wheat seeds from their husks, it's called winnowing. Likewise, winnow ants remove husks from forest seeds. After the seed has been shucked of its elaiosome, the ants don't need it anymore, so they take it back out of their nest and deposit it on the forest floor. There, the seed, no worse for the wear, is free to sprout and grow into a happy forest herb. Having their elaiosome nibbled away by hungry ant babies does not hurt the seeds; in fact, it helps them. When ants pick up these seeds, they protect them from animals that eat the whole seed, and winnow ants plant seeds far away from the seeds' parents. This way, the newly planted seeds don't crowd their parents as they grow.

Seed planting is a successful business for winnow ants and the seeds they plant. Almost two thirds of all herb seeds produced in the forest are picked up by winnow ants. These are herbs like wild ginger and trillium. Also, when winnow ants are removed from forests, some wildflower abundance drops by 50%. Seed planting also helps the ants. When winnow ants eat that candy

Photo Gallery - Planting the forest understory



Two Aphaenogaster foragers are attracted to the ripe elaiosomes of some fallen bloodroot seeds. - © Alex Wild



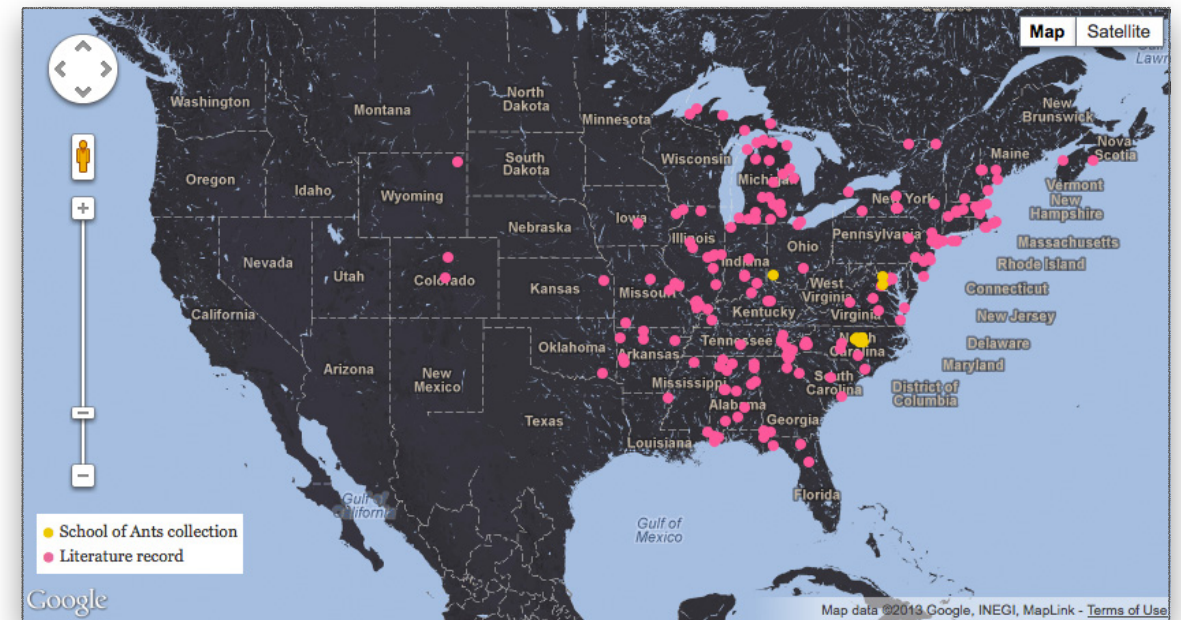
coating elaiosome, they get all the nutrients they need to make more babies.

Farming isn't the winnow ant's only talent. Like other animals, from woodpecker finches to chimpanzees to humans, winnow ants use tools to gather food. When a winnow ant happens upon liquids too goopy to carry back to her nest, she goes out in the

forest and collects bits of leaves and sticks. She takes these bits back to the newfound food and drops them right on top of it. These leaves and sticks become little plates for winnow ants. Workers bring the plates back to the nest for the colony to feast from like Sunday churchgoers at a potluck dinner.

Aphaenogaster rudis is a fancy name, but the winnow ant earned it. How many of us have stood in the living city of a forest, awed by the architecture surrounding us? Somewhere, tucked into the hustle and bustle of creatures keeping the forest alive, creep winnow ants, rusty little architects helping shape everything we see on the ground floor.

School of Ants Map - Winnow Ant



North American distribution of the winnow ant. Visit schoolofants.org for an interactive version.



8 Big Headed Ant

Pheidole

Big headed ant majors are all brawn while their tiny noggined sisters are all brains.



Photo by Alex Wild

Meet the Big Headed Ant

The first time I met my husband Gregory's family, I was convinced he was adopted. He and his brother, Henry, look nothing alike. Where Gregory's lean body stretches to more than 6 feet tall, Henry has the shorter, sturdier build of his parents. A thick mop of almost black hair flops over Gregory's brow; Henry's crown is lightly dusted with strawberry brown like their father. Their teeth are different; their voices don't sound alike; even their fingers and toes are different. I tried to get his parents to confess Gregory's adoption, but they assured me he is their son. On holidays, I tried to trip up his aunt and cousins over the conditions of Gregory's birth, but everybody maintained that he is 100 percent, for sure not adopted. Over time and after much superspy-like investigation on my part, I finally gave up and conceded that Gregory and Henry probably have the same parents. They just don't favor each other. Likewise, it took a similar amount of convincing for me to believe that majors and minors, the two types of workers in big headed ant nests, were not only related but sometimes almost genetically identical.

Big headed ants move about grassy knolls, sandy parks, and forested areas all across the United States, along the east and west coast and all states in between. Three species out of many make the Most Common list: *Pheidole bicarnata*, *Pheidole dentata* and *Pheidole tysoni*. They usually nest in dugouts of exposed soil or under rocks or other objects, but sometimes

Give me the stats!

Size: Minors about 0.1 in, majors about 0.14 inches

Where it lives: Big headed ants inhabit grassy, open areas and forests all across the United States. Sometimes they move into people's homes.

What it eats: Anything from sugary foods like aphid honeydew to dead animals, human garbage, and seeds.

you'll find them in rotting wood or tree stumps or around the house. They have catholic appetites and eat sugary foods, dead insects and animals, human garbage, and seeds.

Big Heads, Little Brains

Whoever gave these ants their common name didn't get too creative. While the minor workers in big headed ant nests look like regular, run-of-the-mill ants, the majors have tremendous heads. Like, huge. I mean, their onions can be bigger than their big bottoms, and sometimes they look like they'll topple forward at any moment. Unlike their smaller sisters, majors also have large snapping mandibles.

Photo Gallery - Big headed ants



Pheidole morrisi foragers work together to move a dead mosquito. - © Alex Wild



Like Gregory and his brother Henry, looking different can have major advantages. While Gregory's nimble fingers and wide hand span help him to play the piano, Henry's sturdier build makes him a great football player. With big headed ants, minors' sprightly size helps them to squeedle in and out of the nest doing typical ant chores like feeding babies, taking out the trash, looking for food, and making sure the queen's alright. Their sleek bodies

move easily between blades of grass and across fallen leaves and other obstacles they encounter as they navigate their world.

Majors, on the other hand, tend to be more linebackers than egg heads. Their big noggins packed with muscle, not brain, majors lend their extra brawn to help defend and carry food too big for minors and to chomp down on intruders unlucky enough to stumble across their nest entrances. While the size differences between majors and minors can be astonishing, understanding how they got that way takes one's breath away.

Here's what's so cool about it: When queens lay a female egg, that egg has the potential to become either a major or a minor. That's right. Majors and minors come from the exact same eggs and can have the exact same genetic makeup. Their physical differences come out based on what their sisters feed them as babies.

So here's a baby big headed ant, a happy pearlescent porkie pie, mouth gleefully open, hoping somebody will come into the nursery and stuff it with more grub. For a certain amount of time in her life as a baby, if her sisters feed her lots of high-protein food (think smashed-up dead insects and Spam), a switch will flip in her grubby little body and chemicals will change her into a big headed major when she grows up. If her sisters just give her regular food (some protein, but also sugary treats), no switch flips, and when she grows up she'll be a little-headed big headed minor. It's that simple, and that beautiful. And it all comes down

to food. It makes me wonder about all those fried chicken dinners at Gregory's house.

Because workers do all the feeding, they can decide how many big heads they want knocking around the nest. For example, when other colonies move into the neighborhood, taking up resources like food and nest space from the big-heads, workers start pumping their babies with protein and making lots of soldiers to prepare the nest for battle.

Don't Quit Your Day Job

But the story of the big headed ant's job doesn't end with its size. Once they're grown, big headed ants, and ants in general, can't hold on to a job. Consider all the chores in an ant colony: baby feeding, grocery shopping, taking the trash out, keeping out the bad guys. Like people who need to learn how to roll over, crawl, and then walk, big headed ant minors work different jobs as they grow up.

When they first emerge as adults, minors' antennae and mouth muscles are weak. I guess they didn't get much of a workout in their childhoods, sitting still snarfling down every scrap of food they could get their mouths around. Too weak to forage or feed their sisters, these youngest workers mostly wander around, getting their sea legs.

Photo Gallery - Big heads, little heads



Some examples of different big headed ant species. Here is Pheidole rhea, North America's largest Pheidole species. - © Alex Wild



As they get older and learn the ropes a bit, minors start to pitch in, nursing their baby sisters with food their older sisters bring home and taking out the trash every now and then. In the sunset of their lives, they finally venture out of the nest, searching for food and defending the nest from intruders.

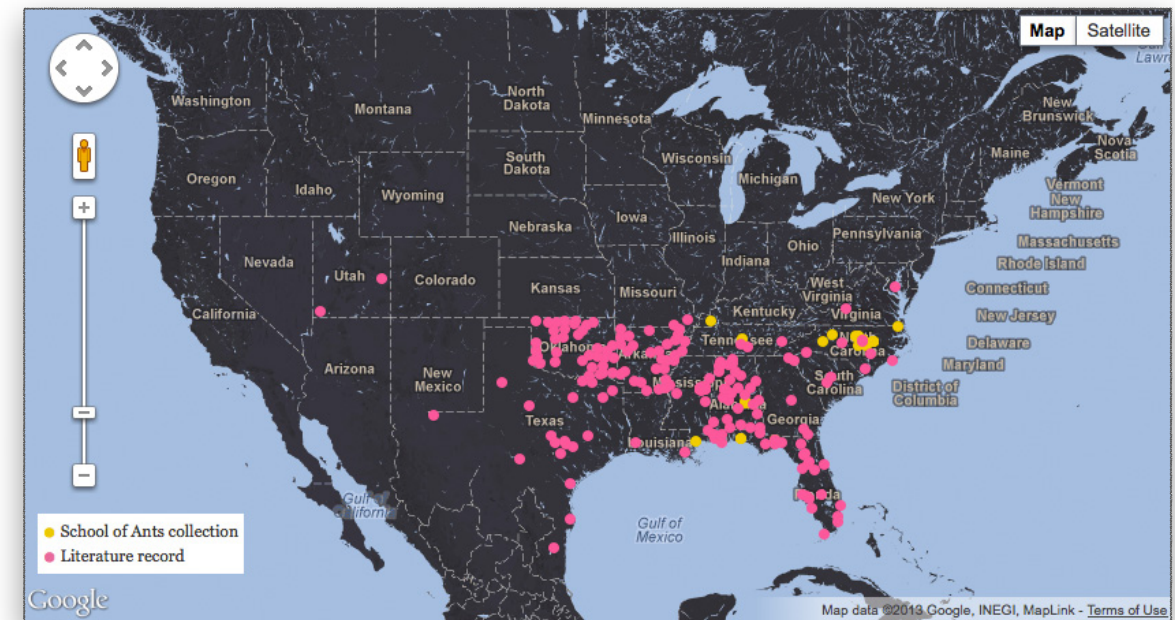
Something wonderful happens to big headed ant minors as they begin their foray into the outside world. Their brains change. Ants don't need to know a whole lot when they're wandering around in the darkness of the nest. Feed this, clean that. But once they step outside, woah! Information overload! Outside the nest, ants need to remember. What does my nestmate smell like? How did I get here? How do I get home? Where do my enemies live?

It might seem like a pretty steep learning curve, but big headed ant minors have it all worked out. As they age, these ants' brains change to help them remember things. Chemicals in their bodies re-wire to help them forage better, and their brains (not their heads, but their brains), particularly the parts where they store their memories, called mushroom bodies, get much, much bigger. All the better to organize and store that information avalanche when they begin moving around the outside world.

Getting the Big Head

So Gregory's not really adopted. Final proof came for me at the birth of Greg's niece, Caroline, a miniature replica of my husband, down to her wide blue water-drop eyes and plump bottom lip. And big headed ant minors didn't adopt their broad-crowned sisters. They formed them, working within their splendid system, the elegant interplay of environment and chemicals and tissues, the resulting dance of living creatures in a living world, perfectly configured elements of nature. No fried chicken dinners needed.

School of Ants Map - Big Headed Ant



*North American distribution of the big headed ant (*P. dentata*). Visit schoolofants.org for an interactive version.*

9 Southern Fire Ant

Solenopsis xyloni

Southern fire ants spell trouble for plants and baby birds.



Photo by Alex Wild

Meet the Southern Fire Ant

Here is a story about a villain, a stinging sensation, and a possible hero. It is the story of the Southern fire ant, known to scientists as *Solenopsis xyloni*. Easily confused in appearance and behavior with the red imported fire ant (*Solenopsis invicta*, that notoriously bad guy from the southeast), Southern fire ants generally make their (much smaller) homes in small, loose dirt mounds in grassy openings or under rocks or boards more in the southwestern United States.

Our story begins with a villain and a few simple facts about the birds and the bees. Actually, just one fact: Birds and bees dread Southern fire ants.

As ground-dwelling predators, Southern fire ants can devastate ground-nesting birds like bobwhite quail. While a quail adult outsizes a Southern fire ant worker 160,000 fold, Southern fire ant nests can have upwards of 15,000 workers who comb the ground with their pinchy mandibles and venomous stingers, swarming quail nests and devouring their much-smaller chicks. In fact, Southern fire ants rank up there with coyotes, skunks and badgers in the top four predators of bobwhite quail nestlings in Texas.

But their bad bird behavior doesn't end with bobwhites. Southern fire ants also attack house sparrow chicks and baby endangered

Give me the stats!

Size: 0.1-0.18 inches

Where it lives: Sometimes bearing a resemblance to the nests of mini-red imported fire ants, Southern fire ants nest in mounds or flattened craters in open soil near moisture. They also can nest under carpets, in crawl spaces or under rocks.

What it eats: Southern fire ants have a healthy appetite for pretty much anything, including dead insects, sweets, greasy foods and sometimes seeds.

least terns. Killing Southern fire ant nests increases least tern populations because Southern fire ants aren't around to chomp away at their fuzzy little babies.

While the gruesome death of one of nature's most squeezably fluffy inventions (baby birds) may seem horrible enough, plants might argue they've got it even worse.

Let's be a plant for a minute, maybe a happy little bush. Here we are in our field, and life is pretty sweet. The sun is shining on our leaves, and our flowers are just beginning to open and say hello to the world. We smell so good, enticing fat little bees to come

bury their fuzzy heads deep within our petals for a drink of nectar. As they burrow in for a sip, they dust their heads with our pollen: an essential ingredient to our life cycle.

Hello, bees! We need these bees to visit us so we can do the one thing we need to do most in this big old world: Reproduce. Make seeds.

Normally, we love ants. They keep the number of pests squiggling around on us stable so we don't get sick or depleted. But to us, these Southern fire ants are the WORST. First, they protect insects that can give us disease or suck us dry, harboring them against predators in exchange for a nectary treat the pests give them as a reward.

Lots of other ant species do the same thing, but not many are as good at it as Southern fire ants. Southern fire ants are such fierce protectors of their flocks of pestilence that they scare away anybody who comes near us, including pollinators like bees and butterflies.

To make matters worse, these ladies rob nectar from our flowers. That is, instead of dusting their bodies with pollen and moving that pollen from flower to flower like bees do, these little jerks bypass our pollen and drink up our nectar.

That's right: Not only do they make us lousy with all those pests, they also prevent us from making seeds, our only task in life! When these ants get on us, we can't get it on.



A southern fire ant climbs a stalk and harvests a grass seed. - © Alex Wild

By now you might be thinking, these ants are just terrible. But I know one ant expert named Andrea who would disagree with you. "I love Southern fire ants," she told me once. "They're so cute and shy. They always try to run away from you. Besides, they're native and they're always getting pushed around by those other fire ants."

This is the other side of Southern fire ants, the side that holds a valuable place in nature. They evolved with the natural environment across the southern United States, helping to regulate the balance of animals and plants in their natural home. Southern fire ants used to live all across the United States, but around the 1950s, red imported fire ants and their big, grumpy

colonies began tramping across the southeast, stomping out many Southern fire ant nests in their way.

Have you ever met somebody with a bad reputation and expected to dislike them, only to find out that they were actually pretty nice? Like Andrea pointed out with her observation, this may be the case with the Southern fire ant; it's possible that we just haven't really met them yet.

With science, we only know what we have studied so far. We've studied Southern fire ants' bird-eating, plant-hurting behavior, so that's their reputation for now. But we have a lot left to learn about these insects.

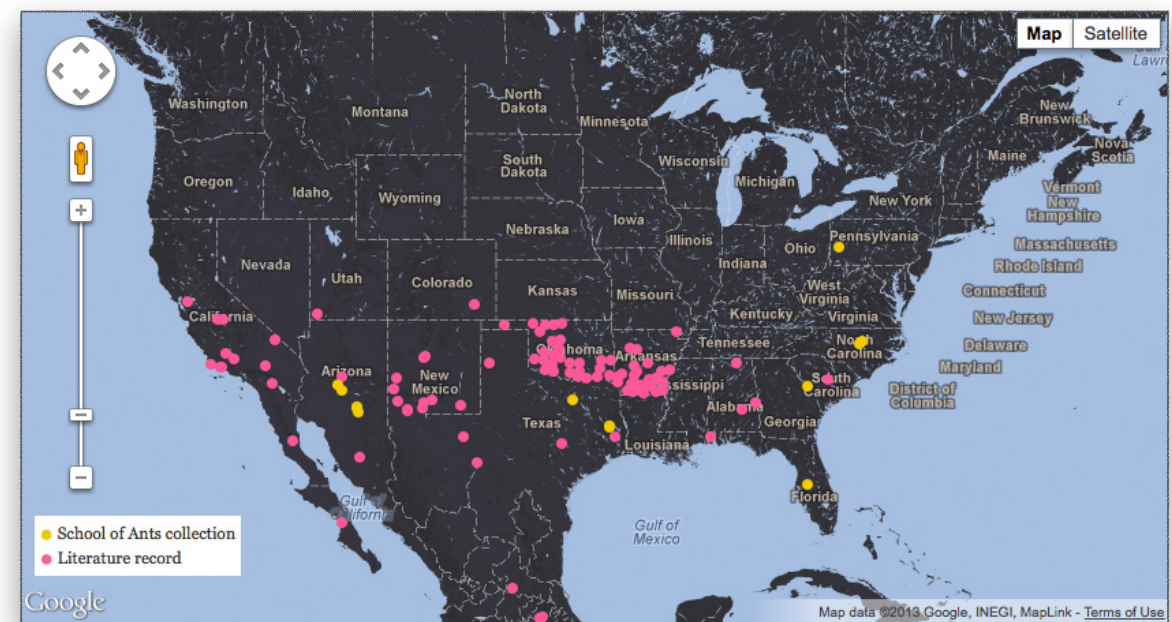
How has the environment changed since red imported fire ants came and Southern fire ants left? How do Southern fire ants behave around other ant species? How often are we mistaking the deeds of red imported fire ants for those of Southern fire ants? I'm sure you could come up with some good questions about Southern fire ants yourself.

We can build on and challenge what we know through exploration. You and I can form our own opinions based on information. Isn't that wonderful? With science, you and I can each meet Southern fire ants, ask questions about them, and discover for ourselves more chapters in the Southern fire ant's story.



A young queen climbs to a high point and prepares for flight. - © Alex Wild

School of Ants Map - Southern Fire Ant



North American distribution of the Southern fire ant. Visit schoolofants.org for an interactive version.

10 Little Black Ant

Monomorium minimum

Despite their tiny size, little black ants beat and bully larger ants competing for food.



Photo by Alex Wild

Meet the Little Black Ant

When I was little, we had a nest of what I later learned were little black ants under a cherry tree in our yard. In the thick of summer, tired of digging foxholes all over the yard, my brother, Will, and I would follow them. We'd grip the trunk with our monkey toes and climb to the outside branches. We'd lean out as far as we could to see what they were up to. So long as we stayed out of their way, they never seemed to mind. They went about their business beneath the leaves and around the branches as we went about ours.

Little black ants are among our cutest “most common” ants. As their common and scientific names suggest, little black ants are much smaller than many of the other ants you see hanging around your house and yard. Their glossy sheen adds a touch of determination to their comings and goings. It's as if they take themselves too seriously, little polished wingtips toddling to and from their important ant business.



Give me the stats!

Size: Workers: 0.06 in; soldiers: 0.06 in; queens: 0.12 in

Where it lives: Little black ants can make their nests outdoors, in forests or right in your back yard, often under rocks and tree bark.

What it eats: Sugary liquid called honeydew, made by small insects called aphids and scales. Also, dead insects, spiders, and your trash.

In our ant stalkings, Will and I quickly learned that, while they might be fun to watch, little black ants could be little jerk ants if we interrupted their work. Although they're small, these ants jabbed their tiny stingers in our thighs and arms if we accidentally blocked their trails. It doesn't hurt much, but it's enough of a reminder to keep moving.

Little black ants bully other ants over food resources. Their colonies can number more than 2,000 workers, and when they get upset, they recruit their sisters in high numbers. When a group of little black ant workers combine forces, their tiny stingers can pack a powerful punch to other ants. They put their best combat skills on display when they protect one of their

favorite foods: the sweet nectar produced by sap-sucking insects such as aphids.

With mouths shaped like drinking straws, aphids live on plant leaves. They stab these drink straws into the leaves and suck out the juice like it's a big milkshake. They then turn that juice into honeydew that they excrete from their rear ends in droplets they hold high in the air, waiting for ants to come and get it. Their milkshake brings the ants to the party.

To reach their favorite syrupy snack, little black ants travel in long lines up tree trunks and plant stems. They make the line by laying down scented pheromone trails. Even once their sisters are gone, the trail remains, a scented road to good food that they follow by waving their antennae back and forth over the path.

In addition to making delicious honeydew, aphids are tasty snacks for other insects like lacewings and ladybugs. But scrappy little black ants kick out other would-be diners from their honeydew buffets even if those diners dwarf our tiny, shiny brawlers. Despite their Lilliputian size, little black ants' stingers and chompy mandibles can inflict more damage than other, larger ant species. With little black ants around to keep predators away, aphid numbers increase up to 10-fold their normal abundance.

Although up to the challenge in groups, when little black ants get caught alone, they have other options. Suppose a fire ant finds a little black ant hanging out on a root and decides to pick a fight.



A tiny species of Monomorium foraging on sandy soil. - © Alex Wild

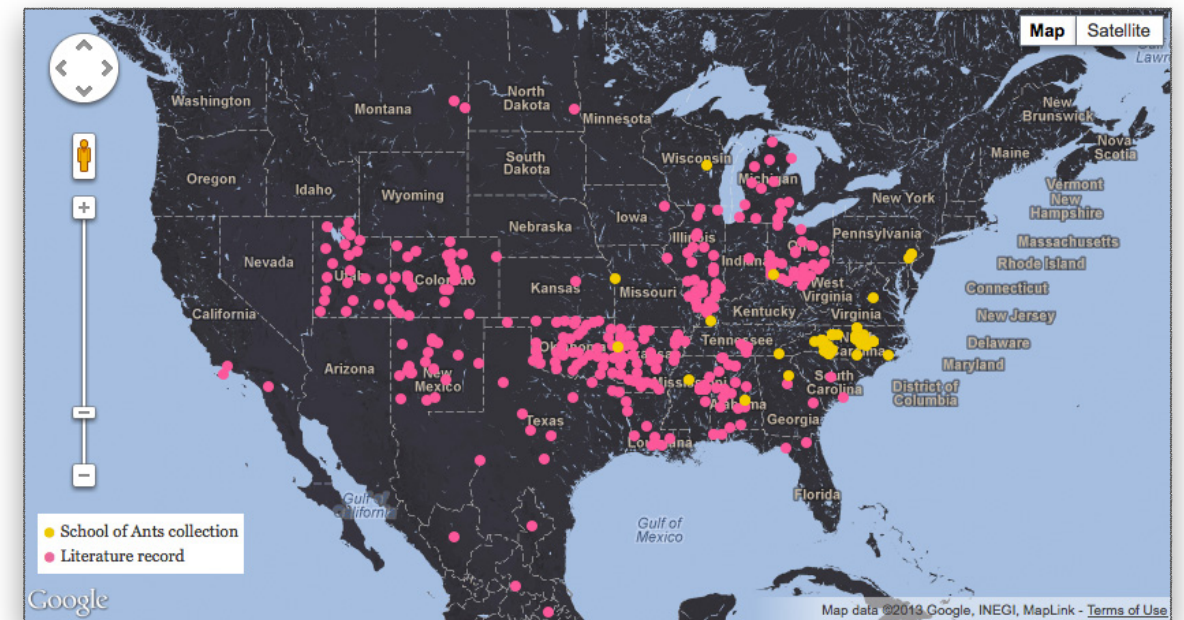
Instead of fighting back, our little black ant “flags” her gaster (her abdomen), wagging it around in the air as if to say, “You’d better stay away from me! I mean business!” While she wags, she releases noxious toxins, hoping to repel a contender before she has to fight.

If booty-shaking fails, our little black ant will curl up and act dead, playing possum in the hopes that the fire ant will think herself victorious and just go away. Sometimes, little black ants combine their individual possum-playing and group brawling behaviors to persist in areas with more dominant ant species. These little ladies can even push out fire ants trying to move into their

neighborhood. They snack on fire ant babies as a reward for triumphant battle.

When Will and I watched the little black ants twine around our cherry tree on those hot summer days, fire ants had not yet made their march into North Carolina. Little black ants were the only game in town on that side of our house, with carpenter ants and field ants galloping through the front yard and Forelius ants staking their claim to the hard-packed dirt and centipede grass in the backyard. Will's a grown up lawyer now; his monkey toes spend the day in dressy shoes. The cherry tree was cut down 20 years ago, its last fat fruits still clung to the branches all piled up on the curb. But little black ants are the same. When I find them greeting me on the walkways of campus or snaking across my porch, their shiny heads determinedly pushing forward, I fill up with the pleasure of seeing old friends. When we understand these elements of nature, get to know them by name and habit, we will always be surrounded by friends.

School of Ants Map - Little Black Ant



North American distribution of the little black ant. Visit schoolofants.org for an interactive version.

11

Thief Ant

Solenopsis molesta

Never underestimate tiny thief ants: they'll rob you (and other ants) blind.



Photo by Alex Wild

Meet the Thief Ant

Back in the days of the Wild West, Jesse James and his outlaw gang were some pretty crafty dudes. They robbed everything from stagecoaches and trains to banks and homes. His bandit bunch crept into towns, only to high-tail it out ahead of angry lawmen and Wanted posters bearing James clan faces. Imagine if the Jesse James family moved in right next door to your house! Many ant species across the United States face this predicament every day when thief ants (a.k.a. *Solenopsis molesta*) come to town. Thief ants are the Jesse James gang of the ant world, and these bite sized burglars pickpocket and plunder anything they can get their little mandibles around, living lives of artifice that would make Mr. James sit up and take some notes.

Even though he was a robber and a murderer, Jesse James won the public's hearts, in part because he was easy on the eyes. Thief ants are no different. Whenever I stumble upon a thief ant



Give me the stats!

Size: 0.06 inches

Where it lives: Thief ants nest underground in forests and open, grassy areas. They also like to nest in human structures. They particularly like nesting near other ant species' nests.

What it eats: Tiny ants with big appetites, thief ants prefer protein like dead insects.

nest or happen to lift a dead insect and find a bevy of thief ants, mid-snack, I always stifle a squeal. Thief ants are unbelievably, ridiculously cute.

Their size might play a big factor in their cute-ness. At 1/16th of an inch, a thief ant worker could wander comfortably around in the lower case "o's" on this page. Most often a golden yellow color, thief ant workers vary along the color spectrum all the way to amber. They have stingers but are too tiny to cause you any pain. They look like they wander around really slowly, but actually they're just super small. If you had a microscope, you could see that each antenna has a bulb on its end, and they bonk about as they feel their way to and from food. Much of that food, remember, is stolen, either from other ants or from you and me.



Thief ants tending to their tiny eggs and larvae. - © Alex Wild

Thief ants get their name from their habit of setting up camp next to other ant species' nests. Thief ants love protein and stuff their bellies on dead insects, people food, and insect eggs. When the other ants bring home thief ants' favorite foods, those crafty little burglars sneak that food right on over to their own houses and feast. They've also been known to smuggle out other ants' babies, tasty snacks for greedy thief ants. When other species' colonies are weak or dying, thief ants aren't as sneaky. They run through the nests' halls like children running down the aisles of a Toys R Us shopping spree, eating their fill of dead and dying ants.

Their crimes and misdemeanors don't stop with the insect world: a thief ant will rob you blind if you don't watch out. Thief ants are

opportunists, and they recognize that your kitchen is a wonderful opportunity for the biggest heist of their lives. Because they are so small, many people have a hard time figuring out how to keep them out of their pantries. The best way to keep thief ants out is to figure out how they're getting in. Once you do that, block their entranceway by plugging holes with some caulk or weather stripping and tell those thief ants there's a new sheriff in town.

Some people think Jesse James was like a modern-day Robin Hood and that many of his crimes were to benefit others. I don't know what Jesse did with all of his loot, but many of the thief ants' crimes against other insects surely do help us out a lot. For example, when they're not stealing from other ants, they love to eat lawn pests like cutworms and scarab beetle eggs, and they provide effective control against these lawn and golf course pests.

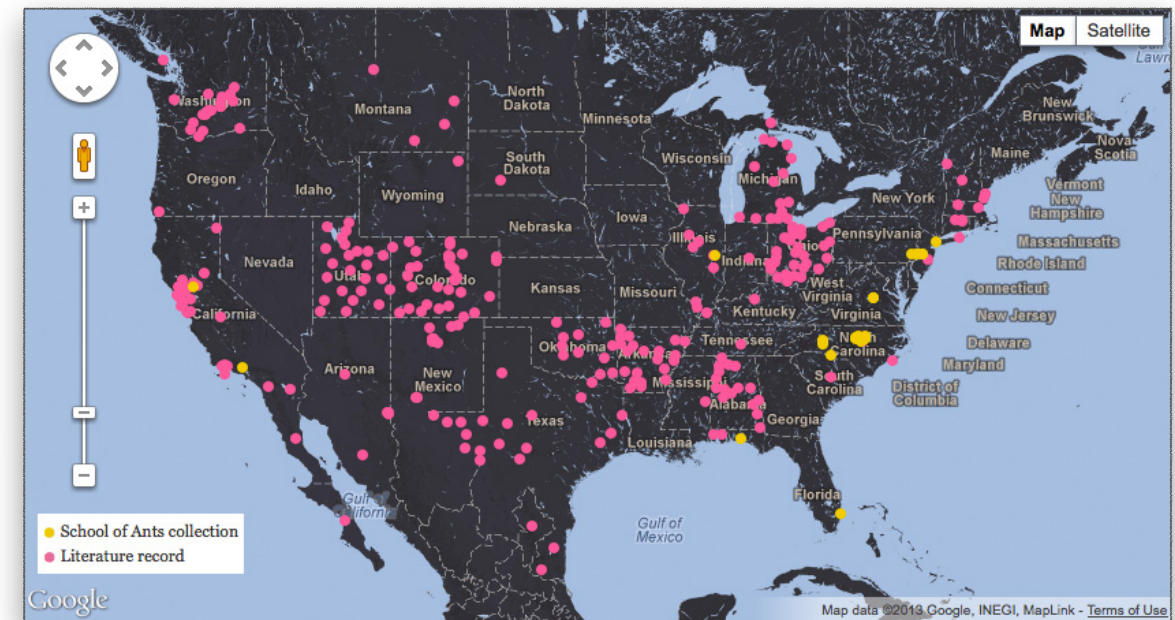


Even though they're miniscule (almost three times smaller than the smallest fire ant), they're pretty good at bullying one of our biggest ant bullies: the red imported fire ant. Like the James gang, they rely on their cunning and strength in numbers to beat up and eat any upstart fire ant colony making camp in their territory. In fact, fire ants can't establish nests in areas where thief ants roam.

Being tiny has its advantages. Because thief ants nest underground and out of sight, they are one of the few ant species who can weather the havoc wreaked by other nasty invaders like Argentine ants and yellow crazy ants. When other ant species get kicked out of town, thief ants hold their ground.

Jesse James's shoot-'em-ups and looting sprees came to an abrupt end when he met the wrong end of Robert Ford's pistol. Fortunately, thief ants survive even the toughest ant assassins. They beat up fire ants and outwit Argentine and yellow crazy ants. Unlike Jesse, who caused trouble with the law wherever he went, thief ants contribute to our natural world. They help keep other pieces of nature in check by eating dead insects and aerating the soil with their underground nests. You could even say they are lawmen in their own right, nibbling away at the pests crawling around your lawn. They're tiny but tough, and they're outside your door right now. Despite their name, thief ants live mostly on the good side of the law.

School of Ants Map - Thief Ant



North American distribution of the thief ant. Visit schoolofants.org for an interactive version.



12 Forelius Ant

Forelius pruinosus

Forelius pruinosus settle arguments the old fashioned way, with a dance-off.



Photo by Alex Wild

Meet the Forelius Ant

The first time I ran into a *Forelius pruinus* worker I'll admit I was underwhelmed. I was ant hunting in a grassy park, laying bait to see which ant species lived in this anty jungle. I'd brought along the perfect enticement: tuna fish mixed with honey. I measured out this ant catnip onto an index card in a tiny spoonful, which I placed on a spot of bare ground under an oak tree. Then I lay in wait to see who would show up.

Before long, many of my old friends came nosing around. A rusty red field ant with speedy long legs was the first to arrive at the party, bending down, legs spread wide like a horse, to drink in the buffet. She was followed by a small flock of odorous house ants, who were chased away by a steady throng of shiny little black ants. A few acrobat ants briefly lurked around the index card's borders, considering the feast and returning to their tree, evidently thinking better of it.

Give me the stats!

Size: 0.07-0.1 inches

Where it lives: Masters of climate, *Forelius* can nest just as happily in your kitchen cabinet as they can in the middle of the desert. They prefer grassy or open ground and often nest under rocks.

What it eats: Excellent scavengers, *Forelius* will eat meaty foods like dead insects and animals, but they often prefer liquid sweet treats, like those produced by aphids.

As the little black ants began to scatter, a collection of tentative ant workers I didn't recognize loitered in a tidy line on the sidelines. Plain-Jane, brownish-red and about half the size of an apple seed, these ladies were otherwise unremarkable in appearance. Unlike the frantic field ants or the spirited little black ants, they were a bit boring.

Watching these austere, drab ladies as they efficiently carried off the remaining bits of index card bounty, I almost felt sorry for them. Where are the great spines of winnow ants? The gargantuan size of wood ants? The giant noodles of big-headed ants? The happy, heart-shaped bottoms of acrobat ants?



Unembellished at best, *Forelius pruinosus*, very common ants with no common name, don't make a knockout first impression.

As I became better acquainted with them, I learned there's more to Forelius (it's fun to say: four-eel-ee-yus) than meets the eye. So, in salute to the lesser known (and maybe less appreciated) Forelius ant, I give to you a countdown of what I believe to be her top five, most notable attributes:

Five. Forelius are masters of climate. They love to nest in open areas and are able to survive just as well in temperate fields and your kitchen or bathroom as they can in deserts.

Four. They smell good. Like odorous house ants, Forelius have a pleasant aroma when you smash them. Their bottoms are packed with a chemical that smells sweet, almost like something you'd use to clean your counters. But don't be fooled by their bouquet bottoms: This smell-good chemical is actually an alarm pheromone that attracts their nestmates, who then form a mob to help their sister in danger.

Three. These clever ants have an entrepreneurial spirit. They figured out a way to trade their bodyguard skills, whether they're looking out for other insects or for plants, for their favorite syrupy treats. Take the catalpa tree, which gets the most out of this ant's fondness for dessert. When catalpa trees put out their leaves, hungry little Jabba the Huts called catalpa caterpillars come to gobble them up. If nobody protects the tree from these fat

Photo Gallery - Forelius ants



A Forelius worker hanging out on a leaf. - © Alex Wild



piggies, catalpa caterpillars can eat every last leaf off the tree, hurting the tree's ability to produce food to survive. To save themselves from starvation, catalpa trees put out the S.O.S. call to our Forelius ants. As soon as a caterpillar chomps down on a catalpa leaf, the tree oozes nectar along its branches, which attracts Forelius ants. The ants don't want anybody messing with their sugar stash, which means the unsuspecting caterpillars are

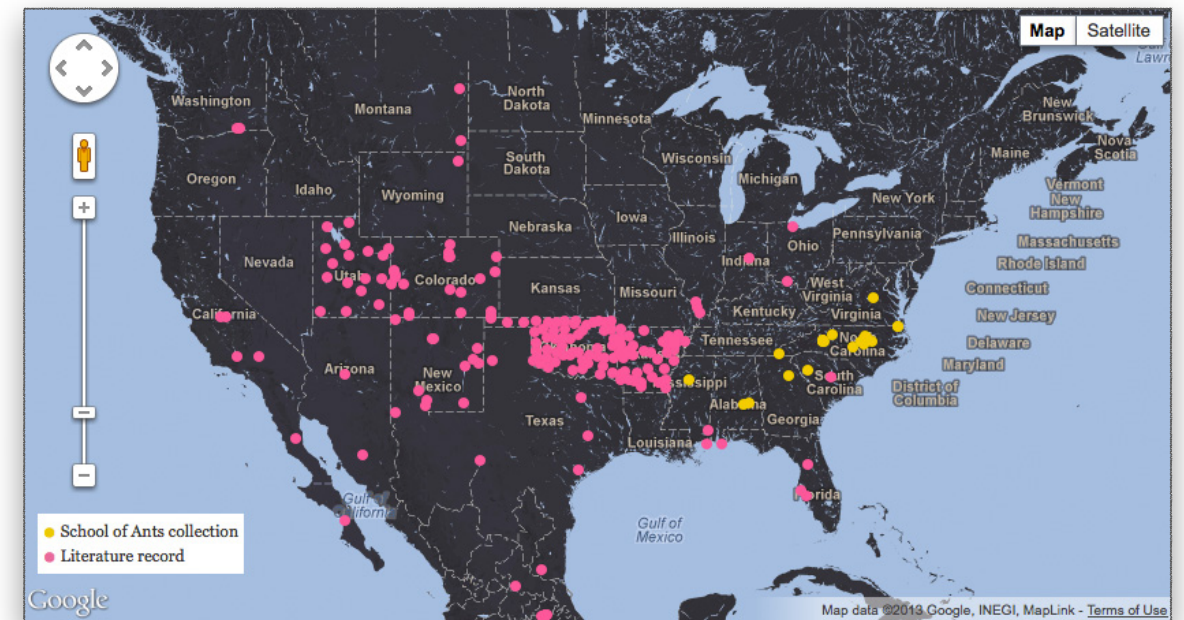
out of luck. Other plants, like wild cotton plants, similarly benefit from Forelius' fierce love of sugar.

But Forelius have no special loyalty to plants. When caterpillars offer to pay them in sugary treats, Forelius are quick take the job. Sometimes, they visit and protect the endangered Miami blue butterfly caterpillars, who offer them a sweet reward for their efforts.

Two. They have the absolute worst party etiquette. To keep other diners off the buffet, Forelius go to those ants' nest entrances in large numbers. Instead of dropping off an invite, they spray bug repellent on the nest entrance, driving the nest's inhabitants deep down. Then, they block up the entrances so those other ants can't escape. Voila! All-you-can-eat is ready and waiting just for Forelius.



School of Ants Map - Forelius Ant



North American distribution of the Forelius ant. Visit schoolofants.org for an interactive version.

One. Forelius can dance! Whenever these ladies are faced with conflict or danger, they try to appease each other with a little jig. They shake their bodies around like they're doing the jitterbug and then point their bottoms in each other's faces. While these dance moves might not make us the belles of our balls, they save Forelius from a lot of cuts and bruises.

So what if they don't have giant spines or huge heads? So what if they don't have cool-shaped bodies? As it turns out, while Forelius ants may look polite and buttoned-up, they're anything but run-of-the-mill workers. With their sweets-loving, booty-shaking, party-crashing ways, Forelius are a great reminder that we should never judge an ant at first glance.

13 Red Imported Fire Ant

Solenopsis invicta

Bad reputation aside, fire ants sometimes help farmers.



Photo by Alex Wild

Meet the Red Imported Fire Ant

Anyone growing up south of Virginia or east of New Mexico has likely experienced the supreme pleasure of jamming a stick into a *Solenopsis invicta*, or fire ant, mound and watching its angry inhabitants boil out from the earth. Fire ants are notorious for their brawly disposition and their pustule-producing stings, but beneath that surface lies an intricate, well-oiled machine, or perhaps the better word is superorganism, that's worth a second look (hold your sticks, please).

Fire ants originally hail from Argentina, Brazil and Paraguay, but ever since they landed in Mobile, Alabama, in the 1930s, they have made themselves at home in the United States. Their conspicuous, large mounds burst from the land across the Southeast like mini volcanoes, dotting open ground, roadsides, agricultural fields and residential areas. Fire ants fill their mounds



Give me the stats!

Size: 0.1-0.24 inches

Where it lives: Fire ants build their mounds in a variety of habitats, including your yard, parks, along roadsides and forest margins, and near swamps across the Southern United States.

What it eats: These ladies love protein and sugar, and will eat anything from dead insects and honeydew to people food.

with galleries and tunnels for storing food, raising young, and just hanging out being ants.

Fire ant mounds also have their own air-conditioning system. Because these mounds extend deep into the earth, the ants can move their colony down to cooler ground when it's hot outside. When temperatures drop, they pull the colony up closer to the surface to take advantage of the sun's warming rays. Fire ant colonies can grow to be large. Some include as many as 200,000 workers, roughly the size of the inner core of my own city, Raleigh, North Carolina.

In order to make a nest large enough for so many respiring, moving, working, eating bodies, they also have a lot of soil to haul. The dirt on the surface of some fire ant mounds (most of which corresponds to the holes they have dug below) can fill 10 gallon-sized milk jugs. Meanwhile, below the surface their underground foraging tunnels can radiate out 100 feet in all directions, allowing them to reach a cool drink of water or even food even when the air above ground is too cold (or just as often in the South) too hot.

All of that soil-turning aerates the ground and helps plants grow, but it gets them—and us—into trouble. Agricultural fields with plantings like soybeans and corn provide everything fire ants need in one place, a kind of agricultural Wal-Mart. The soft, tilled

Photo Gallery - In a fire ant colony



A cut-away of a fire ant mound showing the intricate system of galleries within the nest. - © Alex Wild



earth makes a perfect nesting ground. Pest insects cover the plants—easy prey for fire ants to pick up and take back home. Fewer native ant species roam these fields, offering the fire ants less competition. Farms are where, to these ants, the livin' is easy. Unfortunately, fire ants don't realize farmers plant fields for people, not fire ants. Their mounds damage harvest machinery, and the ants nibble plant roots, resulting in lower crop production.



In addition, fire ants encourage pest insects like aphids to grow so the ants can then snack on honeydew, the sweet substance aphids produce. Plus, they sting anyone unlucky enough to cross their threshold.

When a fire ant stings you, she first grabs your skin with her jaws. Once she has a tight grip, she jabs her stinger, located at the tip of her abdomen, into your skin as many times as she can before you knock her off. Her stinger is a tiny poisoned spear. Each time her stinger makes contact with you, she injects a small amount of toxic poison. This poison causes itching, oozing pustules on most people, but for some unlucky victims, the stings trigger an extreme allergic reaction, anaphylaxis.



Now, what's she up to?

For their friends, their stingers do more than just fuss and fight. In addition to restraining prey and intimidating enemies, fire ants' combination of gripping, pinching mandibles and precise stingers actually most often work as versatile tools that help the workers lay down chemical trails handy in finding their way back home from food resources.

Photo Gallery - Looking for a fight



An Argentine ant and fire ant battle it out. - © Alex Wild



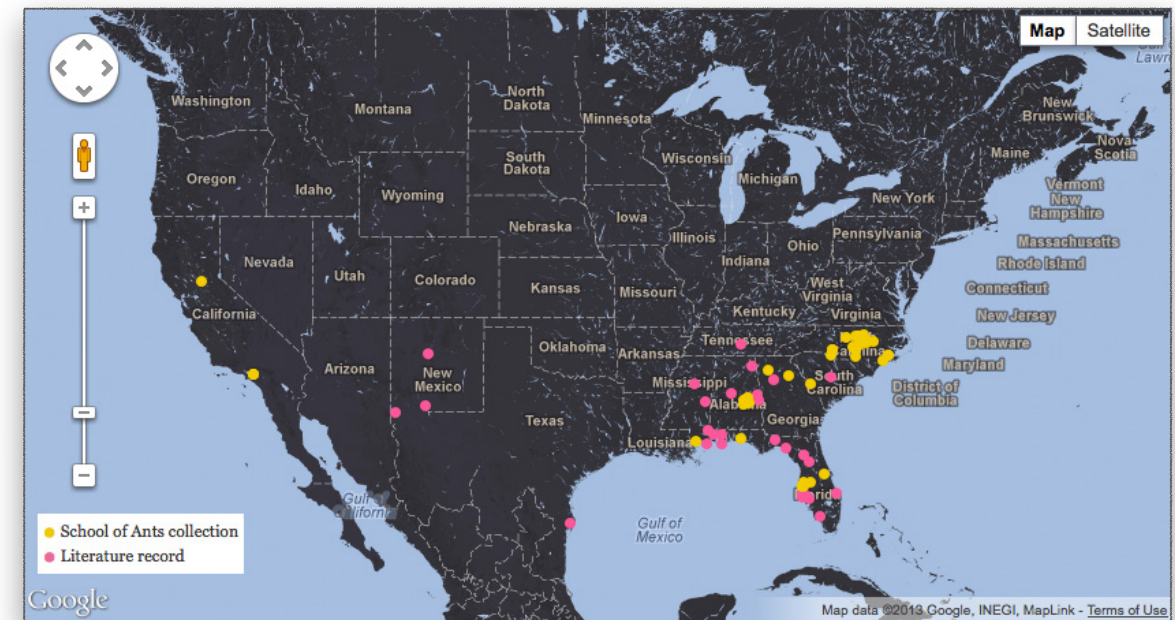
Everything I've told you so far is about how fire ants live in the places they have invaded (or rather, where we have brought them). Back home in their native Argentina, fire ants nest near frequently flooded river beds. Most ordinary ant species would drown in these floods, but not our fire ant (Note, as a Southerner, despite not always liking fire ants, I do think of them, a bit, as "mine"). When the water rises, these ladies hook their legs together to make massive living rafts for their entire colony to

float along and ride out the flood. Workers take turns riding the waves so no ant is left under water for too long. Covered in small, water-repellent hairs, fire ant bodies stay coated in a silvery sheen of air even if you try to dunk them underwater.

Young stick-toting naturalists aren't the only observers captivated by fire ants' curious lifestyle. In fact, the fire ant is the most studied of all ant species by scientists who spend years tracking its behavior and ecology. Scientists and citizens alike try to prevent fire ants from marching forward across the United States. We use an array of poisons and home remedies like boiling salt water. We release enemies like fire ant-eating flies. We make laws to prevent moving them from state to state. But, despite these efforts, fire ants remain, turning soil, laying trails, tending aphids, making rafts. Fire ants live up to their scientific name—invicta, or “unconquered.”



School of Ants Map - Red Imported Fire Ant



North American distribution of the red imported fire ant. Visit schoolofants.org for an interactive version.

14 Acrobat Ant

Crematogaster

Acrobat ants prance through forests and across clotheslines, fluttering their heart shaped bottoms on parade.



Photo by Alex Wild

Meet the Acrobat Ant

One summer, I traveled to a remote North Carolina island for a research project. The project required that I crawl under and around people's homes looking for ants.

While walking to one home, I accumulated a following of local ducks that waddled behind me wagging their bills in hopes of food and quacking reproachfully when they found none. I hate to disappoint, so I snuck into a local's backyard and dumped out my supplies, looking for a duck-suitable snack. As I rifled through my bug-collecting equipment, a man came out of the house.

"Hello, ducks ducks ducks!" he said, and the ducks happily abandoned me for their old friend. Thinking I was caught trespassing, I shoved my equipment back in my bucket and hurried to introduce the man to this potential thief/weirdo lurking around his backyard. He told me he could hear me coming but couldn't see me; he was blind.



Give me the stats!

Size: 0.1-0.18 inches

Where it lives: Most often, you will find acrobat ants nesting under bark in trees, the forest floor, or rotting wood, but sometimes they wander into our homes, snuggling their nests in tight spots like between shingles and in the walls.

What it eats: Primarily sugar lovers, acrobat ants sometimes take a break from lapping honeydew off aphids' rear ends to forage on protein like dead insects.

"I'm looking for ants," I explained.

"Ants?" he asked, "I've got acrobat ants! Come see!"

The ducks and I followed him. He felt the way off his back porch, running his rough hands along the brick walls of his house, around the corner, and pushed his body behind a hedge. He pulled back branches from a wax myrtle tree and revealed a pipe leading into his house. On that pipe? A parade of acrobat ants, their little heart-shaped fannies waving in the sun!

I tried to imagine how he could find this tiny treasure so deeply hidden.

“How in the world could you tell these were acrobat ants?” I asked.

“Because,” he said, and he slammed his hand down on the pipe, smashing a couple of workers. When he lifted his hand, I watched the stunned workers stumble about, smoothing their crumpled legs and antennae, gradually going back to work. “You just can’t squish the jimdurn things.”

He was right; acrobat ants seem to defy squishing.

Acrobat ants are a gift, a joy, and you can find them almost anywhere you’d imagine in the United States, from swamps and forests to your kitchen cabinet. Three species of acrobat ants make the most common U.S. ant species list: *Crematogaster ashmeidi*, *Crematogaster lineolata*, and *Crematogaster cerasi*. These species can be hard to tell apart just by looking at them. About half the size of an apple seed, they range in color from rusty bodies with dark brown/black abdomens to a deep reddish-black all over.

Even so, you can tell acrobat ants from other types of ants by their heart-shaped bottoms, or gasters. They trail in happy lines to and from food. When disturbed, acrobat ants halt and wave these hearts in the air like proud flag bearers in a pageant.

Photo Gallery - High in the air



A forager up in the trees, feeding on nectar. - © Alex Wild



It’s hard to imagine how acrobat ants are among the most abundant ants in forests and homes, considering how fragile colony-founding goes for them. Imagine the big forest where acrobat ants might live. Picture all the towering trees, with their seemingly infinite number of branches, stems and leaves, jutting out against the sky. Now picture one tiny ant, a newly mated

Photo Gallery - Acrobat reproductives



An acrobat ant queen receiving a lot of attention from her dedicated workers (*C. lineolata*). - © Alex Wild



queen, a slightly bigger apple seed, embarking alone for the journey of her life.

All kinds of animals like spiders, mice, beetles and birds would love to snack on our queen, and the forest trembles with life as these predators peek and poke about, looking for a treat. Our queen, our apple seed, keeps her course, searching the branches

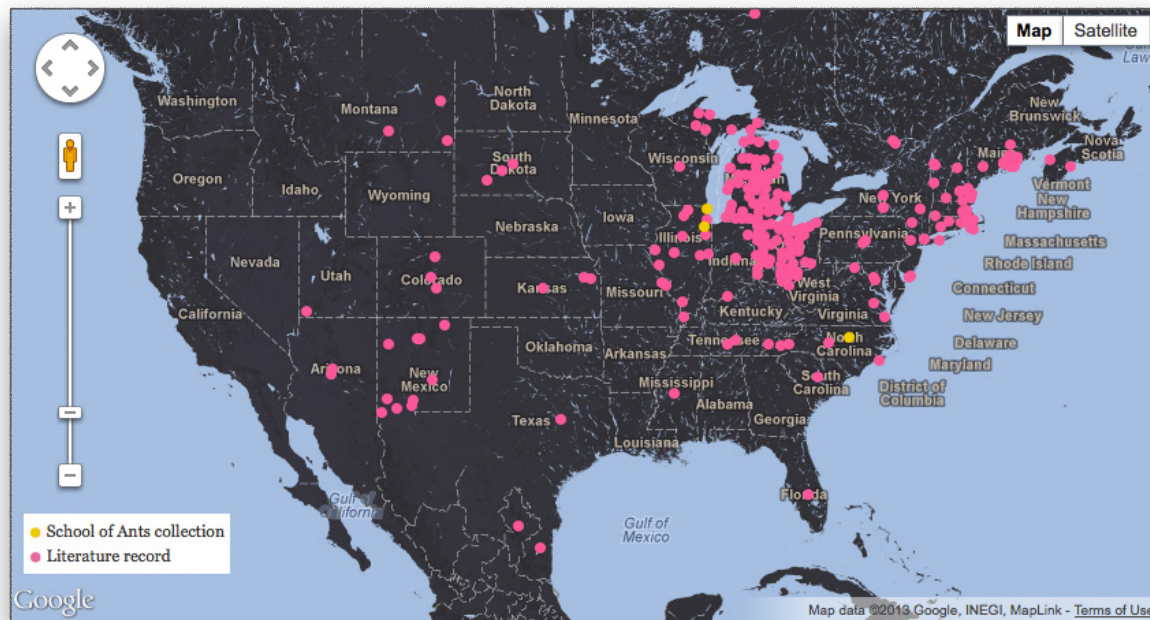
for an abandoned beetle or termite gallery to make her new home. When she finds one, she settles in, laying eggs that will become her empire.

For every 100 acrobat ant queens that journey to find a new home, less than eight survive to form a colony. Once formed, the colony can live 10 to 15 years and may have from a few to several thousand workers crawling across the branches, eating everything from nectar to other insects.

Those workers help keep forests healthy and balanced. Acrobat ants help protect or sustain at least two endangered species: the Miami blue butterfly and the red cockaded woodpecker. In exchange for a sweet substance produced by Miami blue caterpillars, acrobat ants feistily fend off would-be butterfly poachers like birds and other ants. They also are the red cockaded woodpecker's primary diet. Wiping out acrobat ants could have a domino effect across the forest with other species falling down behind them.

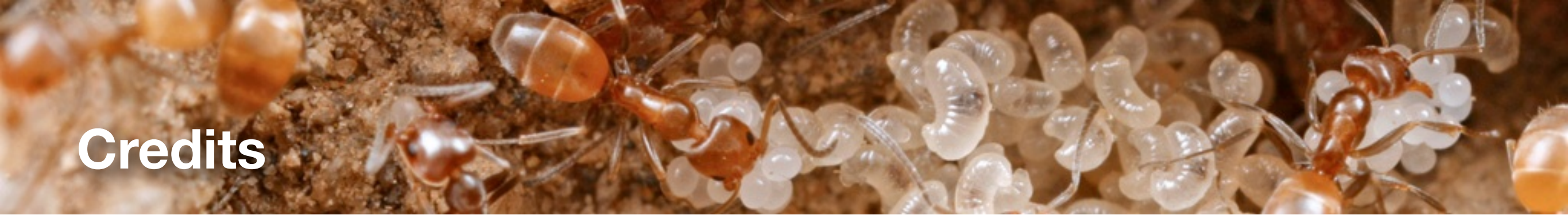
Consummate hosts, acrobat ants often harvest clytrine leaf beetle eggs from leaves and, without eating them, bring them into their nests, where the eggs hatch in a predator-free environment. Another ant-loving beetle *Fustiger knausii* spends most of its life hanging out in acrobat ant nests, relaxing with the brood and riding around on workers' backs. They groom the ants and might get food by enticing workers to spit up snacks for them to eat!

School of Ants Map - Acrobat Ant



*North American distribution of the acrobat ant (*C. cerasi*). Visit schoolofants.org for an interactive version.*

Like my duck-loving friend on the island, you'll find acrobat ants parading around your kitchen or, true to their name, tightrope walking across your clothesline. Don't be afraid of them! They aren't dirty and they won't hurt you. Many of us commonly encounter acrobat ants and don't realize it. That's because unlike my friend, many of us choose to be blind, to ignore these marvels of life as they shiver all around us. Maybe, like my friend, you can take a break to experience the pageantry of the happy procession before you. To enjoy the sensation of those cheery bottoms waving in the air on their way to work. To thank them for the job they do. Just try not to squish them.



Credits

About this interactive book

Dr. Eleanor's Book of Common Ants resulted from the collaboration of a whole team of creative people -- scientists, writers, editors, and a designer.

Eleanor Spicer Rice - Author

Neil McCoy - Designer

Alex Wild - Photographer

Rob Dunn - Creative Director, Author (Preface)

Robin Sutton Anders - Editor

Holly Menninger - Project Manager

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To learn more about our work, please visit yourwildlife.org. We welcome feedback at yourwildlife@gmail.com.

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Eleanor Spicer Rice

Eleanor Spicer Rice loves all insects, but is particularly fascinated by ants. She studied the behavior and interactions of two invasive ant species, the Argentine ant and the Asian needle ant, to earn her Ph.D. in Entomology from North Carolina State University. Ever since she was a little girl exploring the swamps and woods around her hometown of Goldsboro, NC, Eleanor has had a boundless curiosity for the natural world. When she's not turning over logs or poking at the cob-webby corners of her basement in pursuit of a six-legged critter, Dr. Eleanor is sharing her passion about entomology through writing (<http://verdantword.com/>).

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Alex Wild is a biologist in Illinois where he studies the evolutionary history of various groups of insects. He founded a photography business as an aesthetic complement to his scientific work, and now blogs about both entomology and photography. Alex's outstanding photographs of ants have been featured in National Geographic, Discover, Smithsonian

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Rob Dunn

Rob Dunn is a biologist and writer in the Department of Biology at North Carolina State University. Central to all of his work is the sense that big discoveries lurk not only in faraway tropical forests but also in our backyards and even bedrooms. The unknown is large and wonderful and Dunn and his collaborators, students, and postdocs love to spend their days in it (<http://www.robrdunn.com/>).

Your Wild Life

Your Wild Life is a public science program based at NC State University dedicated to engaging the public in the exploration and scientific study of the biodiversity in our daily lives. Learn more and get involved by visiting our website, yourwildlife.org.

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Note: This is a recent name change from the previous *Pachycondyla chinensis*.

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Additional Resources

Throughout the book, we relied on these excellent resources:

Websites:

Antweb: www.antweb.org

Amazing ant photos by Alex Wild: www.alexanderwild.com

Illustrated keys for ant identification by Joe MacGown: <http://>

mississippientomologicalmuseum.org.msstate.edu//

[Researchtaxapages...](#)

Ant taxonomic literature is collected on Antbase: <http://antbase.org>

FORMIS is an online bibliography of ant literature: <http://www.ars.usda.gov/Research/docs.htm?docid=10003>

Books:

Ants of North America: A Guide to the Genera by Brian L. Fisher & Stefan P. Cover

The Ants by Bert Hölldobler & Edward O. Wilson

Journey to the Ants by Bert Hölldobler & Edward O. Wilson

Abdomen

The third major division of the insect body (a.k.a. rump, booty, posterior, etc.) that contains most of the ant’s organs and its stinger.

Related Glossary Terms

Gaster, Segment

Index

Ant

A small, wingless, wasp-like insect that usually lives in eusocial groups. An incredibly diverse and ecologically important animal, Earth houses an estimated tens of thousands of ant species. See Hymenoptera and Formicidae.

Related Glossary Terms

Arthropod, Formicidae, Hymenoptera, Insect, Invertebrate

Antenna (pl. antennae)

A segmented appendage projecting from either side of an adult insect’s head. Antennae function as sensory organs and help ants sniff, feel, and taste.

Related Glossary Terms

Spiracle

Index

Aphid

A small, plant fluid-sucking insect that usually resembles a tiny cicada or a tiny chubby katydid. Aphids can be winged or wingless and usually are found on the underside of plant leaves or along stems. Often protected by many ant species, aphids turn excess plant fluid into a sweet substance called honeydew, which ants eat.

Related Glossary Terms

Honeydew, Scale insect

Arthropod

An animal with jointed legs and an exoskeleton. Arthropoda refers to the large scientific group including shellfish, insects, scorpions, and spiders. “Arthro” comes from the Greek word meaning “joint,” and poda comes from the Greek word meaning “foot.” The vast majority of described species on earth are arthropods. Ants are arthropods.

Related Glossary Terms

Ant, Hymenoptera, Insect

Biodiversity

The amount of different life forms in an area. In general, a rich biodiversity (lots of different life forms) means a healthy environment. Some invasive ant species, like Asian needle ants, reduce biodiversity when they move into an area, which could result in an unhealthy habitat.

Related Glossary Terms

Drag related terms here

Index

Brood

A group of immature individuals in an insect colony. With ants, this means all or some part of the eggs, larvae, and pupae in the nest.

Related Glossary Terms

Colony, Complete metamorphosis, Egg, Holometabolous, Larva (pl. larvae), Pupa (pl. pupae), Queen

Index

Caste

Refers to the various groups of ants within a colony. Sexual castes consist of two groups: males and females. Morphological castes consist of two or more groups, typically minors and majors (soldiers). Temporal castes divide ants according to age and the jobs they do at those ages. Reproductive castes refer to queens, which can reproduce, and workers, which can't.

Related Glossary Terms

Colony, Major, Minor, Morph, Queen, Soldier, Worker

Colony

A group of ants, often closely genetically related, which operate as a functional unit without aggression between them. Colonies can have one or many nests and one or many queens.

Related Glossary Terms

Brood, Caste, Nestmate, Queen

Index

Common name

The moniker we call ants for convenience. Most people referring to ants use their common names. Common names usually refer to some aspect of the ant’s appearance (like “little black ant”) or behavior (like “fire ant”). Common names can be different in different languages.

Related Glossary Terms

Scientific name

Index

Complete metamorphosis

A form of insect development, in which the insect undergoes the following stages to adulthood: egg, larva (looks very different from adults), pupa, adult. Ants undergo complete metamorphosis.

Related Glossary Terms

Brood, Egg, Holometabolous, Larva (pl. larvae), Pupa (pl. pupae)

Index

Crop

A “stomach” attached to the esophagus that serves to receive and hold food. It’s like an internal backpack. Crops hold food without digesting it so ants can share it with their sisters or eat it later.

Related Glossary Terms

Eusocial, Trophallaxis

Index

Find Term

Ecology

The study of the relationships between living things and their environment. “Eco” comes from the Greek word for “house,” and “ology” comes from the Greek word meaning “the study of.”

Related Glossary Terms

Drag related terms here

Index

Egg

The first stage in an ant’s development and laid by queens, an egg has a simple germ cell, nutritious yolk, and a surrounding membrane.

Related Glossary Terms

Brood, Complete metamorphosis, Holometabolous, Larva (pl. larvae), Pupa (pl. pupae)

Entomologist

Someone who studies insects and other arthropods.

Related Glossary Terms

Entomology, Myrmecologist

Index

Entomology

The study of insects and other arthropods. “Entom” comes from the Greek word for “insect,” and “ology” means “the science of.”

Related Glossary Terms

Entomologist, Myrmecologist

Index

Eusocial

If an animal cooperatively cares for its young, has a reproductive division of labor (for example, queens reproduce; workers work), and an overlap of at least two generations sharing a space and contributing to the group, then it's eusocial. Most ant species are eusocial.

Related Glossary Terms

Crop, Trophallaxis

Index

Exoskeleton

The “hard outer shell” of insects and other arthropods. Instead of bones, insects have a suit of armor consisting of a waxy cuticle, and their muscles are attached on the inside.

Related Glossary Terms

Drag related terms here

Index

Find Term

Exotic

In invasion ecology, exotic refers to an organism present in an area that comes from a different place. That is, that organism did not evolve in that area. Exotic species are not always invasive, and they're not always pests. Your pet cat is an exotic species, and some would say it is a pest. Honey bees are also exotic species in the United States. They come from Europe and Africa.

Related Glossary Terms

Invasive species, Pest

Formicidae

The scientific grouping called “family” to which all ants belong. The word “Formicidae” comes from the Latin word meaning “ant.”

Related Glossary Terms

Ant

Index

Gaster

The swollen part of the abdomen behind the ant’s skinny waist, or petiole.

Related Glossary Terms

Abdomen, Petiole, Segment, Thorax

Index

Genus (pl. genera)

A group of species that share characteristics; often closely related. For example, thief ants and red imported fire ants share many physical characteristics and are closely related. They share the genus *Solenopsis*. Knowing genera can help you mentally group ants by form and function.

Related Glossary Terms

Species

Index

Holometabolous

The quality of an organism, like an ant, to undergo complete metamorphosis.

Related Glossary Terms

Brood, Complete metamorphosis, Egg, Larva (pl. larvae), Pupa (pl. pupae)

Index

Honeydew

A sugary fluid excreted from the abdomens of many different insects, including aphids and scale insects. Many ant species love to eat honeydew and rely on it for survival.

Related Glossary Terms

Aphid, Scale insect

Hymenoptera

The scientific order of insects to which ants belong. Bees and wasps also belong to this order, and these three types of insects share much in common, including their skinny wasp waists and tendency toward forming social groups. “Hymenoptera” comes from the Greek god Hymen, who was the god of marriage and “ptera” from the Greek word for wings. The fore and hind wings of winged Hymenopterans (including ant queens and males) are joined, or married, together by tiny hooks.

Related Glossary Terms

Ant, Arthropod, Insect

Index

Insect

A class of animal that has an exoskeleton, three major body segments (head, thorax, abdomen), six legs, and two antennae. Ants are insects. Spiders (eight legs, two segments) are not.

Related Glossary Terms

Ant, Arthropod, Hymenoptera, Invertebrate

Invasive species

A species that moves into an area and negatively impacts that environment. Red imported fire ants and Asian needle ants are invasive species.

Related Glossary Terms

Exotic, Pest

Index

Invertebrate

A general term referring to any animal that does not have a backbone. Worms, insects, crabs, octopi, and spiders are all invertebrates. Most of life on earth has no backbone.

Related Glossary Terms

Ant, Insect

Index

Larva (pl. larvae)

The second stage in an ant’s development, between egg and pupa. Larvae differ in form from adults and often look like grubs.

Related Glossary Terms

Brood, Complete metamorphosis, Egg, Holometabolous, Pupa (pl. pupae)

Index

Major

A worker subcaste in which the individual is typically larger and specialized for defense. Big headed ants have the most prominent majors, but other ant species, like fire ants and carpenter ants, can have majors, too. Sometimes referred to as soldiers.

Related Glossary Terms

Caste, Minor, Morph, Polyethism, Queen, Soldier

Index

Mandible

The first pair of jaws in ants. Mandibles usually stick out from the front of the head and are good for chomping, slicing, and carrying.

Related Glossary Terms

Drag related terms here

Index

Minor

A worker subcaste in which the individual is typically smaller and specialized for work.

Related Glossary Terms

Caste, Major, Morph, Polyethism, Queen

Index

Find Term

Morph

Any of the various forms of ants within a caste. For example, a major is one morph, while a minor is another.

Related Glossary Terms

Caste, Major, Minor, Polyethism, Polymorphism, Soldier, Worker

Index

Myrmecologist

A person who studies ants.

Related Glossary Terms

Entomologist, Entomology

Index

Native species

An organism that is present in an environment “naturally” and not because a human facilitated its presence in the environment.

Related Glossary Terms

Drag related terms here

Index

Nest

With ants, a nest is a discrete living space for a related group, usually containing workers, brood, and queens, but sometimes containing any combination of the three. Nests can be as simple as a hangout spot under a rock (like with odorous house ants) or as complex as intricate underground tunnel networks connecting rooms (like with winter ants). Ant species can have one or many nests per colony.

Related Glossary Terms

Nestmate

Index

Nestmate

Individuals, usually related, who share a nest. Nestmate can also refer to members of the same colony who don't particularly share a nest. Nestmates do not fight one another when they meet outside the nest, and they recognize one other as nestmates because they smell alike.

Related Glossary Terms

Colony, Nest

Pest

A species that negatively impacts its environment. Some ant pests, like odorous house ants, are “nuisance pests,” meaning they only bother people but don’t necessarily negatively impact the environment. The primary economic damage they cause comes from people who don’t want them around trying to get rid of them by purchasing chemicals or paying a pest control operator. Other pest ants, like red imported fire ants, are true pests, meaning they cause economic damage (like crop loss), and/or are health risks (for red imported fire ants, their sting). Not all pests are invasive species or exotic species, and not all exotic species are pests.

Related Glossary Terms

Exotic, Invasive species

Petiole

The skinny segments at the beginning of the abdomen, between the thorax and gaster, that give ants their skinny wasp-like “waists.”

Related Glossary Terms

Gaster, Segment, Thorax

Index

Pheromone

Any one of many chemical secretions used to communicate within species. Ants use pheromones to communicate a variety of messages, including alarm pheromones, recognition pheromones, and trail pheromones.

Related Glossary Terms

Drag related terms here

Index

Polyethism

The division of labor among members in the colony. Different forms of polyethism are apparent in ant colonies. For example, many ants display something called age-based polyethism, where younger workers perform different tasks than older workers (see big headed ants chapter).

Related Glossary Terms

Major, Minor, Morph, Polymorphism, Soldier, Worker

Index

Polymorphism

In ants, having several physical forms of adults. Many insects display polymorphism.

Related Glossary Terms

Morph, Polyethism, Pupa (pl. pupae)

Index

Pupa (pl. pupae)

The life cycle stage in insects with complete metamorphosis. In ants, it occurs between the larva and adult stages when the insect becomes inactive, doesn't eat, and develops the physical features of an adult.

Related Glossary Terms

Brood, Complete metamorphosis, Egg, Holometabolous, Larva (pl. larvae), Polymorphism

Index

Queen

In ants, female colony members who can lay fertilized eggs. Usually larger than workers.

Related Glossary Terms

Brood, Caste, Colony, Major, Minor, Soldier, Worker

Index

Scale insect

A small, plant fluid-feeding insect that looks like a bump, shell, or scale stuck to plant bark or stems. Often protected by many ant species, scale insects turn excess plant fluid into a sweet substance called honeydew, which ants eat.

Related Glossary Terms

Aphid, Honeydew

Index

Scientific name

The formal epithet used to describe species; regulated by a huge international formal naming process. Usually with Greek or Latin roots, scientific names are the same in any language across the globe. This standardization is extremely useful for communicating science. Just like we have first and last names, scientific names consist of two parts: one for genus and the other for species. As knowing somebody’s name can tell you about that person, knowing scientific names can tell you a lot about the insect. The genus name is like our last name and the species name is like our first name. For example, my name is Eleanor Spicer Rice. If I told somebody from my hometown my name, that person would know I’m kin to the Spicers, and could have a general knowledge about me before they even got to know me. If she knew my relatives, she could get an idea of what I might look like and could have an idea of where I live and to a certain degree how I might behave. If you tell an ant scientist you saw a *Brachyponera chinensis*, even if he’s never met one, he would know a lot about how the species looks, lives, and acts if he knows other *Brachyponera*. Just as my first name, “Eleanor,” distinguishes me from the other Spicers hanging around town, the specific epithet distinguishes each species from all the other species and gives us an idea of what that species does. For our *Brachyponera chinensis*, “*chinensis*” tells us this species is native to Asia. While species might have the same specific name, no two species share both genus and species name. That way, there’s no confusion about which species scientists are talking about.

Related Glossary Terms

Common name

Index

Find Term

Segment

In insects, any division of the body. While segment can refer to each joint in the leg or antenna, we most often think of segments when discussing one of the three major insect body divisions: head, thorax, and abdomen.

Related Glossary Terms

Abdomen, Gaster, Petiole, Thorax

Index

Soldier

See major.

Related Glossary Terms

Caste, Major, Morph, Polyethism, Queen

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Species

A group of individuals that are genetically similar, able to mate and produce offspring that can also mate and produce offspring.

Related Glossary Terms

Genus (pl. genera)

Spiracle

The holes on an insect’s body that open to its respiratory, or tracheal, system. Basically, it’s how the insect breathes. Like our mouth or nose.

Related Glossary Terms

Antenna (pl. antennae)

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Thorax

The second, or middle, segment of an insect. The thorax is the locomotion center.

Related Glossary Terms

Gaster, Petiole, Segment

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Trophallaxis

In ants and other eusocial insects, the process of exchanging gut contents between individuals through the mouth. It's one way ants share food and communicate information.

Related Glossary Terms

Crop, Eusocial

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Worker

In social insects like ants, a member of the laboring caste that isn't able to reproduce.

Related Glossary Terms

Caste, Morph, Polyethism, Queen

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